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JOURNAL OF THE
AMERICAN DIETETIC ASSOCIATION

VOLUME 16 January, 1940 NUMBER 1

THE NEWER KNOWLEDGE OF VITAMIN C IN HEALTH AND DISEASE[1]

E. NEIGE TODHUNTER

State College of Washington, Pullman

"Juyce of lemmons was ever reputed a cold medicine—and yet to that notable and cold and terrible disease of the scurvy how excellent hath it been approved."
The Surgeon's Mate—Woodall 1639

SOME 265 years were to pass from the time Woodall wrote these words until scurvy was produced experimentally in guinea-pigs and prevented by changing the diet of the animals. Another ten years passed before it was determined definitely that some unknown substance present in fruits and vegetables would cure scurvy and this substance was then named vitamin C. In the next decade vitamin C was isolated in pure crystalline form, then synthesized in the laboratory and named ascorbic acid, which name is generally used today though for a time the term cevitamic acid was advocated by the medical profession.

During the past seven years since the isolation of ascorbic acid, rapid progress has been made in the study of its physiological properties and its significance in human nutrition and the research papers on this one vitamin alone number several hundred publications each year. Some of the recent developments in this field of research pertinent to the field of dietetics will be discussed in this paper.

Properties. Pure ascorbic acid is a white crystalline powder readily soluble in water, and oxidized on exposure to light and air. These particular properties should be kept in mind because of their significance in food preparation. Ascorbic acid has a high reducing power; this action is a reversible one and the ease with which hydrogen is taken up and given off probably accounts for the biological activity of ascorbic acid as part of the oxidation-reduction system of the body and in cell respiration.

Another specific rôle which has been clearly established for ascorbic acid is that of a regulator of the colloidal condition of the intercellular substance of the body. In the absence of vitamin C the tissues are unable to manufacture intercellular material and this results in changes in tooth structure, and in those well-recognized symptoms of scurvy: hemorrhages, because of the

[1] Read before the General Session, American Dietetic Association, Los Angeles, August 29, 1939.

weakness of the walls of the blood vessels; and swelling of the joints and fragility of the bones due to loss of supporting substance. Vitamin C has also been found to be present in the cerebrospinal fluid and this has led some investigators to propose that the vitamin functions in the metabolism of nervous tissue (1), but further evidence is necessary on this point.

There are no stores of ascorbic acid in the body comparable to the reserves of vitamin A in the liver, but vitamin C is widely distributed throughout the organism; this is not surprising when we consider the physiological functions just described. Vitamin C has been reported as present in pituitary and adrenal glands, in tonsil, spleen, pancreas, liver and kidney, in the lens of the eye, in the intestinal mucosa, and in tumors, and it is also present in blood, urine, and spinal fluid.

The presence of vitamin C in blood and urine has stimulated investigation of the amount present in these body fluids to see if such measurements might be used as an indication of the state of vitamin C nutrition of the individual. Also the availability of supplies of pure ascorbic acid and a knowledge of its properties and reactions has made it possible to develop new methods for the quantitative determination of vitamin C in foods and body tissues. Thus investigators of the last few years have concerned themselves with two general types of problem: first, the measurement of vitamin C in blood and urine in clinical cases as a possible indication of subscurvy (*i.e.* those borderline cases which are deficient in vitamin C yet are not quite low enough, or have not progressed quite far enough to show obvious signs of scurvy), and in large scale surveys where blood and urine values might serve as a measure of the state of vitamin C nutrition of the general population; second, the use of so-called "saturation" studies to determine the quantitative requirement for vitamin C at various ages, and factors which may influence this requirement.

Quantitative Measurement of Vitamin C. Quantitative work requires the use of a method that will facilitate accurate results, and suitable units in which to express the findings. The older, time-consuming method of measurement was to determine the amount of a given food which would just protect a guinea-pig from scurvy under certain specified experimental conditions. This has now largely been replaced by a chemical method using a dye, 2,6,dichlorophenolindophenol, which is readily reduced to a colorless substance by ascorbic acid. Since this oxidation-reduction reaction between the dye and vitamin C is a quantitative one, the amount of the vitamin present in an extract of food or in body fluids may readily be determined when titrated with a dye solution of known strength. However, it must be mentioned here that substances other than vitamin C will also reduce the dye and are a source of error in many determinations; therefore animal assays should still be used at intervals as a check on the reliability of the chemical method.

Units. Before vitamin C was chemically isolated a certain quantity of lemon juice, 0.1 cc., was accepted as the international standard for one unit of the vitamin. Later it was found that the amount of ascorbic acid present in 0.1 cc. lemon juice averaged 0.05 mg.

and this weight of the pure crystalline substance is now considered the equivalent of 1 I.U. Each milligram of ascorbic acid, therefore, is equivalent to 20 I.U. However, since the vitamin measurements are made on the weight basis, it seems more logical and less confusing to express ascorbic acid values in *milligrams* rather than in international units.

Measurement of the State of Vitamin C Nutrition. The first attempts to measure the state of vitamin C nutrition of individuals were made by the capillary resistance test which is based on the fact that hemorrhages due to fragility of the walls of the capillary blood vessels are one of the characteristic symptoms of scurvy. This method was developed by Göthlin of Sweden who measured the number of petechiae which appeared on a given area of the arm in a specified time when a definite pressure was applied. Many modifications of this method have been widely used; however, factors other than the amount of vitamin C in the tissues may affect the capillary fragility and it cannot be used as a measure of low vitamin C intake or mild scurvy. Also, the results obtained from capillary resistance tests have not shown a correlation with the values obtained for the vitamin C levels in blood and urine of the same individuals.

In 1933 Harris and co-workers (2) showed that vitamin C could be quantitatively determined in urine and that the amount there present depended on the dietary intake. They suggested that the measurement of vitamin C in a 24-hour sample of urine could be used in the diagnosis of vitamin C subnutrition (3). They reported that the average normal excretion was 30 mg. per day and that a deficiency was definitely indicated when the excretion was less than 15 mg. More recent investigations have shown that many factors may influence the amount excreted and that therefore the determination of the amount excreted for a single day gives no reliable indication of the state of vitamin C nutrition of the subject.

"Saturation" tests are now used in urinary studies and are based on the fact that the body does not store vitamin C. If an individual is receiving adequate amounts of the vitamin in the daily diet any excess will be excreted in the urine. In its simplest form then, this method involves the determination of the urinary level of vitamin C while the subject continues on his customary diet. A massive dose of 300 mg. or more of pure ascorbic acid is then given and the amount excreted in the urine for the next 24 hours is determined. If the diet has been adequate, the tissues are already "saturated", *i.e.* they hold all the vitamin C they need, and there is an immediate and marked rise in the amount excreted. On the other hand, where the dietary intake of vitamin C has been low there will be little or no rise in excretion until the dose has been repeated for several days.

Many modifications of this method have been used, the dose varying from 300 to 1000 mg. given orally and in some cases intravenously or intramuscularly; shorter collection periods, such as the 6-hour excretion have also been used. Results of many of these investigations are unconvincing and difficult of interpretation since almost every investigator has a different standard or meaning for saturation. Also, individual variations are great and even in subjects who have

been living on high vitamin C diets the saturation dose cannot be fully recovered in the urine; the larger the test dose, the lower the percentage of it recovered in the urine.

The saturation test is of value in individual or specialized group investigations as a means of studying the requirement for vitamin C and it can be used in clinical studies as an aid in diagnosis of hypovitaminosis C. It has not, however, proved itself well-suited to large scale surveys of the vitamin C nutrition of the population because of the difficulty in securing the full cooperation of the subjects and collecting complete urinary samples over a period of several days.

There are technical difficulties also in that the vitamin is rapidly destroyed in urine; there are other interfering substances present which reduce the dye and thus cause the vitamin C excretion to appear to be higher than it really is; the natural pigments of the urine also tend to obscure the end point of the titration; the *p*H of the urine, and the use of drugs such as atropine, aspirin and pyridium may also affect the results.

The vitamin C content of the blood is believed by some to be a better indication and the method free from some of the errors involved in urinary determinations. In this a fasting sample of a few cc. of blood is taken, the corpuscles removed by centrifuging and the protein-free plasma titrated with dye solution. In normal persons receiving an adequate intake of vitamin C the blood levels have been found to be from 0.8 to 1.2 mg. per 100 cc. blood plasma; values above 1.2 mg. are obtained when the tissues are fully saturated. In scurvy the blood levels may be close to zero, and from 0.0 to 0.4 mg. is accepted as indicating a very poor state of vitamin C nutrition; from 0.4 to 0.8 mg. per 100 cc. is probably sub-optimal (4, 5).

Some investigators have recommended that a single fasting sample of blood may be used to determine the state of vitamin C nutrition; however, with this method as for those previously described, there are certain technical difficulties and the method is limited in large scale survey work because of the practical difficulties in obtaining blood samples.

Another test which has been recommended is that proposed by Rotter (6). Dye solution is rapidly decolorized by ascorbic acid and Rotter has proposed, therefore, that the time taken for the decolorization of a drop of dye solution when injected under the skin could be taken as a measure of the amount of vitamin C present in the tissues. Other workers have failed to confirm these findings and the test does not appear to be a reliable one (7).

Normal Requirement. How much ascorbic acid is required daily? Unfortunately, it is not possible for several reasons to give a conclusive answer to such a question, and many apparently contradictory statements are to be found in the literature.

There is good agreement as to the amount which is required daily in order to protect from scurvy. In the British Navy it was found that a daily allowance of one ounce of lemon juice, *i.e.* 15 mg. of ascorbic acid, would prevent scurvy, and this is probably the absolute minimum for protection against obvious signs of the disease. Experimental work with guinea-pigs has shown quite clearly that to maintain the normal tooth structure twice the amount to protect from

scurvy is required, and if this information is applied to adult human needs it brings the minimal requirement to 30 mg. daily. The same value has been obtained by Göthlin using the capillary resistance test. He found that in order to prevent the breakdown of the capillary walls and the appearance of hemorrhages in an adult woman he had to give a daily allowance of 1 cc. orange juice, *i.e.* 0.5 mg. ascorbic acid, per kilo of body weight, or 30 mg. as a *minimum* for a woman weighing 60 kilo.

We must be fully aware that absence of disease or lack of any obvious signs of ill health is not a criterion of good nutrition. By how much then must this amount be increased? This question is more difficult to answer. There are several factors which influence the individual requirement. The effect of bodily activity on ascorbic acid requirement has not yet been fully investigated, but some workers (8) have reported that violent exercise and active participation in sports caused a lowered excretion of vitamin C indicating a more rapid use or destruction within the body. There is some evidence from our own experimental work that fatigue after long hours of study and laboratory work causes a lowering of blood and urinary content of vitamin C.

Ascorbic acid is normally present in perspiration and studies (9) on natives working in the hot, humid conditions of the gold mines of South Africa have shown losses of vitamin C in body sweat amounting to 2 mg. ascorbic acid per hour. It is probable that in very hot weather, or in activity resulting in increased perspiration, the normal individual loses vitamin C from the body in this way.

Other individual factors must not be lost sight of and these include body weight, differences in basal metabolism, variations in intestinal absorption and destruction within the gastro-intestinal tract.

Using the methods of blood and urine analyses in determining the amount of vitamin C required to maintain saturation of the tissues, variable results have been obtained depending on the method used. From such studies a general conclusion is that 50 to 60 mg. daily are required. A careful survey of the literature and evidence from our own laboratory lead to the conclusion that this amount should be considered as the lower level of adequacy rather than optimal. A recent report (10) states that to maintain complete saturation of the tissues 70 to 100 mg. daily are required and in terms of body weight the requirement is 1 to 1.6 mg. per kilogram. Using the same method in our laboratory, we have found that 1.2 to 1.8 mg. per kilo is required.

Because of these various influencing factors any recommendation for vitamin C requirement must be looked on as a general indication rather than an absolute value. It has been shown that massive doses of ascorbic acid can be taken without any detrimental effect, and it would, therefore, seem wiser to err on the side of a liberal intake of vitamin C than to endanger health by attempting to get along on the minimal requirement.

Requirement in Pregnancy and Lactation, and in Infancy. The fetus withdraws ascorbic acid from the maternal organism and the concentration in the blood plasma of the umbilical cord has been found by a number of workers to be from two to four or more times greater

than that of the maternal blood stream at the time of delivery. The blood level falls as pregnancy advances even though the diet may be improved during that time, and there is a marked decrease in the ascorbic acid content of the blood at the end of labor. In some cases Teel (11) found that the blood of the maternal plasma at delivery was less than one-half what it had been during the first 28 weeks of pregnancy. That the infant withdraws adequate vitamin C from the mother was also shown in a study (12) of the livers of 70 infants coming to autopsy. The liver concentrations were high at birth, but in infants of one month of age the liver reserves had fallen greatly and from that age on the amount depended on the diet.

These data and those of other workers clearly indicate the need for increased supplies of ascorbic acid in the diet of pregnant and lactating women and an intake of at least 100 mg. daily is desirable.

The vitamin C content of the food of the breast-fed infant is dependent on the mother's diet; human milk has been found to vary in vitamin C content from one to 10 mg. per 100 cc. When there is a liberal dietary intake of vitamin C the milk values are from 6 to 8 mg. per 100 cc. thus providing the infant with approximately 40 to 50 mg. per day. However, the vitamin C content of cow's milk is very much lower than that of human milk, it is rapidly destroyed when the milk is allowed to stand in bottles exposed to the light, and there is considerable destruction by pasteurization (13). The plasma of artificially-fed infants not receiving any added vitamin C was found by Snelling (14) to contain between 0.05 mg. and 0.52 mg. ascorbic acid per 100 cc. which is considerably below the normal level and he therefore recommends that artificially-fed infants should receive additional vitamin C beginning at 2 weeks of age. Infants receiving breast milk low in vitamin C had less than 0.5 mg. blood ascorbic acid and it is recommended that vitamin C supplements should also be given to breast-fed infants when the mother's milk contains less than 4 mg. ascorbic acid per 100 cc. of milk.

How much the infant should receive for optimal nutrition is still a question. Ten milligrams per day is the minimum amount which will prevent scurvy in infants under one year, according to recent findings of Macy and co-workers (15) in a clinical study of 427 infants. At least twice this amount would probably be required for normal tooth development, and, as in the case of adults, double this amount is necessary for adequacy, making 40 mg. daily the requirement in infancy.

Requirement in Therapeutic Diets. Blood levels and urinary excretion of vitamin C have been measured in many cases of disease to determine whether a vitamin C insufficiency might be a predisposing cause, or whether increased intake of the vitamin might be of value in the treatment of such diseases.

In scurvy the urinary excretion is practically negligible and the blood level falls to below 0.4 mg. per 100 cc., and although this is the only disease known to be caused by a dietary deficiency of vitamin C, lowered blood and urinary values have been reported for a number of other diseases. Faulkner and Taylor (16) found that in patients with infectious diseases the serum ascorbic acid

values were usually well below the values found in normal persons and in the presence of infection the amount of vitamin C in the diet necessary to raise the blood serum level and urinary output to normal values was far greater than the usual requirement.

A number of investigators have reported lowered excretion in tuberculosis. In a recent study (17) ten tuberculous children on a diet containing 55 to 65 mg. vitamin C daily were all excreting less than 10 mg. per day, while a control group of healthy children with the same dietary intake excreted 30 to 35 mg. When the control group were given additional vitamin C there was an immediate and marked rise in excretion showing that they were saturated, whereas added vitamin C caused no rise in the tuberculous group until daily feedings had been continued for 15 days.

Similarly, low blood and urine values have been reported for gastric ulcer, pneumonia, rheumatic fever, rheumatoid arthritis, osteomyelitis and some vascular diseases. There is no conclusive evidence that lack of vitamin C is a predisposing cause to any disease other than scurvy but there is evidence that in certain therapeutic diets, as for gastric ulcer, vitamin C is deficient, and that in many diseases there is malabsorption or increased destruction of vitamin C within the body so that several times the normal requirement is necessary to maintain tissue saturation.

The value of a liberal vitamin C intake in the diet of surgical patients is also indicated by the work of Ingalls and coworkers (18, 19) who found that wounds from operative incisions in guinea-pigs partially deprived of vitamin C ruptured at a pressure of only about one-third that required to rupture the wounds of normal animals and the scar tissue was distinctly abnormal. These findings are believed to be directly applicable to humans and of particular importance in surgical cases of ulcer where the patient is often maintained on a diet devoid of vitamin C.

The significance of vitamin C in the treatment of parodontal disease is shown by a recent report from Harvard University Dental School where Weisberger and co-workers (20) studied the blood levels of 65 dental patients. More than two-thirds of this group had blood values ranging from zero to 0.8 mg. per 100 cc., *i.e.* below the normal level, and showed some congestion of gingival tissue; in some cases there was bleeding and soreness of the gums and loosening of the teeth. A study of the dietary history of these subjects showed that all had been living on diets with a low intake of vitamin C. It is of particular interest here to note that the low intakes of vitamin C were associated with histories of gastroduodenal complaints, use of prescribed but deficient diets in colitis, economic conditions, allergic states, and dislike for ordinary food sources of the vitamin. Fifteen of these patients were studied for their response to additional vitamin C feedings. The blood level was raised to normal in all cases, but the time taken and the amount of vitamin C required was greater for those with the lowest blood levels. Clinical improvement in the condition of the tissues was observed but not until 2 weeks of continued vitamin C feeding after the blood level had reached normal.

Is There a Dietary Deficiency? The question arises at this point, is there a

deficiency of vitamin C in the average diet today? The answer is not an easy one. We lack information on the dietary intake of vitamin C of the greater part of the population as the methods just described for determining the state of vitamin C nutrition of large groups have been developed too recently for many data to be available. Dietary surveys which have been made do not give very satisfactory information because in these the vitamin C content has usually been calculated from the average values for raw foods. Such dietary estimates, therefore, are probably much higher than the actual consumption since vitamin C is readily destroyed.

Wright (21), speaking last year before the American College of Physicians said, "It should never be forgotten that scurvy is a common disease and a common complication easily missed, easily diagnosed and easily cured." And Finkle (22), in a study of 127 patients in a New York City hospital, stated that "the conclusion seems inescapable that a fairly large proportion of the population, as represented by the groups encountered in the wards and outpatient department of our hospital, suffers from an undersaturation with vitamin C. In most instances this is, undoubtedly, merely part of a general dietary insufficiency."

Even the inclusion of two fruits and two vegetables in the diet is not sufficient guarantee of vitamin C adequacy. In some recent laboratory experiments we used what might be considered a good diet. It was adequate in calories, minerals and vitamins except vitamin C, for analyses showed that the daily intake of ascorbic acid was only a little more than 10 mg. The vegetables used were carrots and beets and the fruits, pears and prunes. Such a diet is adequate only if the fruits and vegetables included are those high in vitamin C.

Dietary Sources. The question next arises, since pure ascorbic acid is available, whether it should be used to supplement the diet or be added to foods which do not contain the vitamin. A definite answer can be given to such a question. Pure ascorbic acid is of value in clinical cases where very high doses must be given or where food cannot be tolerated; it is also invaluable for research but in all other instances natural food sources of the vitamin should be used. This business of eating is a very pleasant one, and this country is capable of producing abundant supplies of fruits and vegetables. Also there is considerable evidence that the body can make better use of the vitamin C in foods than of the crystalline substance. Those foods which supply vitamin C also contribute other minerals and vitamins and possibly some essential dietary factors which are as yet unrecognized.

Occasional cases of scurvy have been reported (23) which would not respond to treatment with crystalline ascorbic acid but were cured by use of lemon juice or some other natural source of the vitamin.

Excellent tables are now available (24, 25, 26) summarizing the data on the vitamin C values of fruits and vegetables. These tables indicate wide differences in the vitamin C content of different foods and that the same food may also vary greatly. Analyses of many fruits and vegetables such as apples, oranges, peas and raspberries show that some varieties are 3 to 6 times higher in ascorbic acid than an-

other variety of the same foodstuff. Soil is also a factor; spinach grown on muck soil, for example, has been reported to be twice as rich as that from upland soil. The vitamin is unevenly distributed within the plant itself, the peel of the apple containing 3 to 4 times as much as the apple flesh while the leaves of plants are much richer in the vitamin than the roots.

Practically all fruits and vegetables contain enzymes which oxidize vitamin C to a form which is physiologically inactive. This enzyme action begins almost as soon as the garden crop is gathered and continues until the enzyme is destroyed by the heat of cooking or blanching before canning or freezing. The longer that fruits and vegetables are delayed in their transport to the markets or held in ordinary storage before using, the greater is the loss in vitamin C. A sample of peas recently studied in our laboratory showed that when harvested and left in the pod at room temperature there was no vitamin C loss in 8 hours, a 10 per cent loss in 24 hours, and a 25 per cent loss in 72 hours. Similar peas, removed from the pod and allowed to stand, lost about one-seventh of their ascorbic acid in 8 hours, and one-fourth in 24 hours.

Ordinary cooking processes may cause 50 per cent or more loss of vitamin C from vegetables (27) and the use of alkali such as baking soda greatly increases the destruction. The presence of copper in equipment or cooking utensils also speeds up the destruction of vitamin C. Allowing cooked vegetables to stand for any length of time before serving, particularly standing on the steam table, also increases vitamin C loss. Canned foods, when there is no delay between harvesting and processing and where modern methods of oxygen removal are used, may retain the greater part of their vitamin C. Frozen foods lose none of the vitamin while held in the frozen state, but if allowed to stand after thawing there is considerable loss, and for those vegetables which must be blanched before freezing there is some loss due to this process.

It is difficult to make any general statement or comparison of specific fruits and vegetables as sources of vitamin C because of the influencing factors of variety, soil, climate and storage as mentioned above. It is unfortunate that black currants are no longer grown in this country as they are the richest of all common fruits in vitamin C content, containing 136 to 220 mg. per 100 gm. of fruit. Referring to the tables of Fixsen and Roscoe (25), orange juice contains from 22 to 89 mg. per 100 cc. and a similar content is found in strawberries, gooseberries, papaya, raspberries, grapefruit, and lemons. In the vegetable class, broccoli, kale, kohlrabi, cauliflower, spinach and cabbage all have a range of values similar to the above mentioned fruits and tomatoes come within the lower range value of this group.

While fruits with natural acidity and green vegetables are highest in vitamin C, many other fruits and vegetables contain significant amounts and in certain areas where abundant and therefore cheap, or when obtainable from the family's home garden, they may if used in sufficient quantities provide adequate vitamin C without having to use the richer but probably more expensive fruits and vegetables from other areas. The potato might be considered

here, one serving providing about one-quarter of the day's requirement of 50 mg. and very little is lost in cooking. It is not sufficient simply to include some fruits and vegetables in the diet in the hope that this takes care of vitamin C requirement and particularly must this be remembered in preparation of low cost diets.

This I know has been a far from satisfactory statement of the actual values of different foods, particularly to those of you concerned with institution feeding or relief diet planning where every cent expended for food must be carefully considered. The fruits and vegetables as sources of vitamin C are often among the more expensive food items and to what extent these may be limited and yet maintain dietary adequacy is an important problem for you. For these reasons, I believe it may soon be a regular procedure for the hospital dietitian and others concerned with large scale buying to determine by titration the ascorbic acid content of fruit juices and possibly of canned or frozen fruits and vegetables being used in institutions.

Summary. Vitamin C can be determined in blood and urine by titration with 2,6, dichlorophenolindophenol and the amount present depends on the dietary intake.

In scurvy the excretion of vitamin C is almost negligible, the blood level being below 0.4 mg. per 100 cc. In normal individuals the blood level is above 0.8 mg. Some therapeutic diets are low in vitamin C; and an increased requirement is indicated in many disease conditions. The daily requirement for normal adults should not be less than 50–60 mg. per day and more is required in pregnancy and lactation.

Indications are that many of the average diets today are low in vitamin C.

As one writer has put it, when a construction firm is asked to build a bridge the specifications do not call for a bridge which just meets the minimal requirements or which will just carry the average load. The bridge builders construct the finest, strongest bridge they can make. Should human construction be less important than bridge construction? You cannot make people healthy any more than you can make them good, but those of you who have the responsibility of feeding people or advising them what they should eat, can, by encouraging a liberal daily use of fruits and vegetables, contribute to better body building and to the general health and well-being of the population.

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A STUDY OF FOOD PURCHASING HABITS OF INDIGENT AND NEAR INDIGENT FAMILIES[1]

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SINCE January 1, 1938, the nutritionists of the Detroit Department of Health have been collecting data on the food purchasing habits of people coming under their supervision in the clinics of the department. The clinic clientele is made up of pregnant women and well babies whose family incomes are below the level of independent self-support. The majority of the 100 records included in this study were kept by women who were dependent upon public welfare, Works Progress Administration funds, or unemployment compensation relief.

The objective of a public health nutrition program is to teach the elements of normal nutrition to the citizens of the community. In order to achieve that objective, particularly with indigent groups, some attempt must be made to guide the expenditures of money for food. Consequently it is routine practice in our clinic service to work out food budgets for all of those patients who are willing to cooperate and who can be stimulated to make the necessary alterations in their food habits. To obtain basic information upon which plans can be formulated, each family is asked to keep a detailed account of food purchased for a two-week period. By comparing the amounts of money granted to families on the various relief plans with the total expenditures recorded, a fairly reliable check on the completeness of the records is obtained. From these purchase records it is possible to determine accurate weights and measures and actual costs of food materials. While these cannot give specific information about the various members of the family, they do indicate general composition and illustrate trends in consumption practices.

The technic used in collecting data for this study was as follows: Upon admission to prenatal and child welfare clinics, new patients are interviewed by the nutritionists. In discussing normal nutrition, budgeting problems come to light. To find out how much money is being spent and whether it is buying maximum food value, each patient is given a form upon which to write down her expenditures. She is asked to bring the record the next time she comes to clinic. If she does not return on schedule or fails to bring the report with her, the nutritionist calls upon her in her home. The amount of food purchased is compared with the quantity necessary for the members of her family according to the standard for an adequate diet at minimum cost set up by Carpenter and Stiebeling's *Diets to Fit the Family Income*. Discrepancies between the standard and the amounts bought are pointed out to the patient with suggestions for improvement. A second record kept one month later serves as a measure of teaching accomplishment and helps to show the patient her degree of success. After a budget has been worked out and given to the family, the

[1] Read before the Michigan Dietetic Association, Harper Hospital, Detroit, May 12, 1939.

records of expenditures are filed. Analyses of 100 of these records picked at random, representing several different districts in the city, reveal some interesting facts.

There were 202 adults and 263 children in the 100 families included in the study. The average number of days covered by each record was 14.

The total amount of money spent for food by the 100 families was $1,305.88. The average expenditure per family per week was $6.52.

TABLE 1

	BELOW STANDARD	ABOVE STANDARD	ADEQUATE
	families	*families*	*families*
Milk	81	12	7
Potatoes	53	34	13
Dried beans, lentils	57	28	15
Tomatoes, citrus fruit	48	42	10
Leafy vegetables	56	37	7
Dried fruits	61	23	16
Other vegetables	49	43	8
Grain products	44	54	2
Fats	30	62	8
Sugars	15	73	12
Meat	38	56	6
Eggs and cheese	39	38	23

The average daily per capita expenditure for food was 21 cents. At current retail prices, a per capita expenditure of 25 cents is necessary under average circumstances to provide the essentials of adequate nutrition.

An evaluation of the diets of the 100 families is shown in Table 1.

Analyzing the purchases of the various types of commodities, some interesting facts were revealed as follows:

Milk. The average expenditure per family for milk was 21 per cent of the total amount spent for food. This provided .53 qt. (1 pt.) per person per day. Forty-five per cent of the milk purchased was fresh; 46 per cent, evaporated; and 9 per cent, buttermilk. According to the standard, the daily per capita intake for these 100 families should be .73 qt. (1½ pt.). The average price for milk was 8 cents per quart.

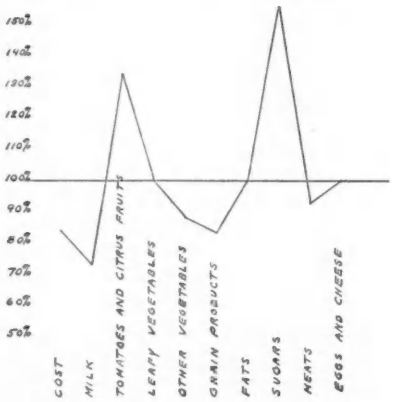
Fruits and Vegetables. The 100 families studied purchased an average of 1.03 lb. of vegetables per person per day. This total quantity was divided among the three groups as follows: Tomatoes and citrus fruits, .18 lb. (3 oz.); leafy green and yellow colored vegetables, .19 lb. (3 oz.); all other fruits and vegetables, .66 lb. (10 oz.). The standard specifies .13 lb. (2 oz.); .19 lb. (3 oz.); and .75 lb. (12 oz.) for these three groups respectively. The average cost of vegetables was approximately 4 cents per pound. Very few canned vegetables or fruits were purchased with the exception of tomatoes.

Grain Products. Breads, cereals, and other grain products like rice, macaroni, crackers, etc., were bought with 16 per cent of the money spent for food. The average per capita amount purchased was .49 lb. (8 oz.) while the standard indicates .59 lb. (9 oz.) as the minimum desirable quantity. The greater part of the grains used were of the highly refined type, whole wheat bread and whole grain cereals rarely being listed. In terms of bread, breakfast cereals and other grain products, the per capita purchases were .18 lb. (3 oz.), .06 lb. (1 oz.), and .25 lb. (4 oz.), respectively.

Fats. Fats purchased were divided into three groups: butter; lard, margarine, and oils; and bacon and salt pork. Thirty-six per cent of the families bought no butter at all and the average daily per capita amount purchased was .02 lb. (.3 oz.) of butter; .07 lb. (1 oz.) of lard, margarine and

oils; and 0.4 lb. (.6 oz.) of bacon and salt pork. The total per capita quantity of fat purchased was .13 lb. (2 oz.) per day. According to the standard, .13 lb. (2 oz.) per person per day is required for good nutrition.

Sugars. The proportion of food money spent for sugars was 5 per cent. The average daily per capita quantity



GRAPHIC ILLUSTRATION OF THE COMPARISON OF FOOD PURCHASED BY 100 FAMILIES WITH THE STANDARD MINIMUM COST ADEQUATE DIET AS DESCRIBED BY CARPENTER AND STIEBELING IN "DIETS TO FIT THE FAMILY INCOME"

The base line or 100 per cent represents the desirable quantities of the various food substances. The variations from the standard of the families studied are illustrated by the curve, plotted in terms of per cent above or below standard.

bought was .14 lb. (2.2 oz.) while the standard average amounts to only .09 lb. (1.5 oz.). Seventy-six per cent of the whole quantity purchased was in the form of sugar, 15 per cent in syrups of various kinds, and 9 per cent in jams, jellies, and candies.

Meats. Animal products, exclusive of eggs, milk, and cheese, claimed 12 per cent of the money spent for food; .15 lb. (2.25 oz.) per person per day is the average provided for in the standard. The 100 families studied bought .14 lb. (2.24 oz.). On the whole, the cuts of meat purchased were well chosen—ground meat, boneless stews, and glandular organs seemed to take precedence over the more wasteful and expensive cuts. Prepared meats were used by some of the families but with an average expenditure of 18 cents per pound; no gross extravagances in this respect were obvious.

Eggs and Cheese. The average expenditure per family for eggs and cheese amounted to 8 per cent of the total food bill; .08 lb. (1.25 oz.) of these commodities was provided for each of the members of the 100 families each day. The number of eggs purchased supplied an average of .59 eggs per person per day. Adequate nutrition, according to the standard, requires .57 eggs daily for each individual. The per capita average of cheese bought by these families was .01 lb. (.16 oz.).

Accessories. This group of products includes tea, coffee, spices, seasonings, flavorings, etc.; 7 per cent of the money expended purchased these items.

Summary of expenditures and per capita averages for the various commodities included in a well balanced, minimum cost diet, is shown in table 2.

From the data revealed by the records of the 100 families studied, the following conclusions and deductions may be drawn:

1. Indigent and near-indigent families coming under the supervision of the nutritionists of the Department of Health through the clinic services, are spending their limited incomes very well as far as food purchases are concerned. The average per capita expenditure is less than the actual minimum cost of an

adequate, well balanced diet, but the total sum is fairly well distributed among the various essential items, indicating good value for money expended.

2. There are no grossly extravagant items included in any of the 100 records. The vegetables and fruits purchased were the ones which were in season and inexpensive; the meats were the cheaper and most nutritious cuts; very few condiments and accessory foods like pickles, jellies, catsup, etc., were purchased.

TABLE 2

	AVERAGE % OF TOTAL FOOD MONEY	AVERAGE AMT. PURCHASED PER PERSON PER DAY	AVERAGE DAILY PER CAPITA REQUIREMENT
Milk	21	.53 qt.	.73 qt.
Vegetables and fruits	20	1.03 lb.	1.07 lb.
Grain products	16	.49 lb.	.59 lb.
Fats	11	.13 lb.	.13 lb.
Sugars	5	.14 lb.	.09 lb.
Meats	12	.14 lb.	.15 lb.
Eggs and cheese	8	.08 lb.	.06 lb.
Accessories	7	—	—

3. Caloric requirements are met at the expense of some of the protective elements. The over-buying of sugars and the substandard consumption of milk demonstrate a tendency to meet energy needs and satisfy appetite before the mineral and vitamin requirements are provided.

4. The dietary deficiencies which may be predicted from this study are as follows: (a) calcium—because of the low intake of milk, the best known dietary source of this mineral; (b) vitamin B complex—because of the very limited use of whole grain cereals and buttermilk, which together with lean meat and yeast are the chief food sources of this complex factor; (c) vitamin D—because of the very limited distribution of this element in common foods and the complete absence of cod liver oil or its equivalent on the records of purchases; and (d) vitamin C (possibly)—because of the destruction of this factor in the presence of heat and by oxidation.

CONCLUSIONS

Since the subclinical signs of vitamin deficiencies include constipation, anorexia, diarrhea, dermatoses, and vague pains and discomforts, and since these are the same complaints commonly suffered by clinic patients, it seems justifiable, in the light of the facts revealed by this study of purchasing habits, to assume that malnutrition in various stages of severity is rather prevalent.

RECENT VITAMIN RESEARCH: II. VITAMINS C, B COMPLEX AND THE LESS WELL KNOWN VITAMIN FACTORS[1]

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VITAMIN C

NO PHASE of nutritional research has enjoyed more dramatic progress than that relating to the nature of scurvy and its prevention through the isolation and characterization of the specific factor, ascorbic acid. The isolation of this substance eluded workers for more than ten years and after the task had been accomplished by Szent-Györgyi (1) in 1927 it was not until five years later that anyone, even Szent-Györgyi himself, knew that it was vitamin C. In connection with his studies of reducing substances in various tissues he isolated a compound which "was named by its protocol number 'C XII' being the twelfth substance prepared and examined in my work on tissue oxidation and the function of the adrenal cortex." The use of the letter C was entirely fortuitous and in no way was meant to imply that the substance was related to vitamin C. Szent-Györgyi was the first to demonstrate that plant juices contain a substance with an extraordinary affinity for oxygen. He was able also to isolate this substance in crystalline form and in 1928 gave it the name "hexuronic acid" (2). At that time he believed the substance to be associated with vitamin C but that it was not vitamin C itself.

In this country King and associates (3) were engaged in investigations of the relationships between vitamin C and "hexuronic acid." They were the first, in 1932, to isolate vitamin C in crystalline form (4) for which the name ascorbic acid was suggested later and generally accepted.

Following the identification of this important substance, attention was directed toward its concentration, isolation, synthesis, chemical, physical and physiological properties, and methods of assay. *The Newer Knowledge of Nutrition* (l.c.) summarizes the chief chemical and physical characteristics of ascorbic acid as follows:

> Visible light is said to have a markedly destructive action on the vitamin. Even light which passes through a milk bottle causes a rapid destruction. Whether this effect is related to the presence of copper or other catalysts is not clear.
>
> In view of the above it is readily understandable that ascorbic acid is readily destroyed during the ordinary cooking of foods. However in an inert atmosphere it is quite stable to moderate heat, although the reaction might be alkaline. But in the presence of oxygen destruction is rapid and complete when the *p*H is above 7 and heat is used. The vitamin is more stable to oxygen in acid media, hence it undergoes less destruction in foods containing free acid such as citrus fruits, tomatoes, etc., than in less acid foods. Modern commercial processes of canning foods prevent marked ascorbic

[1] This and the preceding article, "I. Vitamins A, D, E", appearing in the December, 1939, JOURNAL, were received for publication September 27, 1939.

acid destruction by removing much of the air from food before it is sterilized in the cans by heat. The process of drying foods tends to destroy much of the vitamin.

History records the countless and needless loss of life from scurvy, "calamity of sailors." As early as 1734, according to James Lind, Bachstrom asserted that fresh fruits and vegetables protect the body against scurvy. Lind himself in 1753 corroborated the assertions of Bachstrom by many observations and trials. It required the experimental production of the disease in guinea-pigs by Holst and Frölich in 1907 to establish definitely that scurvy is due to dietary deficiency. Experimental production of scurvy has also resulted in the careful study of its histopathology and has yielded an insight into the physiological rôle of ascorbic acid.

The symptoms of scurvy are familiar —loss of weight, fatigue, pallor, shortness of breath, susceptibility to hemorrhage, fragility of the bones and loosening of the teeth. In describing vitamin A deficiency attention was called to the fact that integrity of epithelial structures is dependent upon a sufficiency of vitamin A and that most of the symptoms of A deficiency are referable to breakdown of these structures. Similarly, ascorbic acid is concerned chiefly with the maintenance of cells of mesenchymal origin. These are cells derived from the middle of the three layers of the primitive embryo and give rise to all fibrous and connective tissues. Ascorbic acid is necessary for the formation of all intercellular substances having collagen, or collagen-like substance, as their basis. The characteristic hemorrhages of scurvy are attributable to the inability of the body to produce the cementing substance which holds the cells together and prevents the separation of the single layer of cells which form the walls of blood capillaries. This substance constitutes the foundation of all fibrous structures, the matrices of bone, dentin, cartilage, and all non-epithelial cement substance, including the lining of the smallest blood vessels. Thus it is apparent why the odontoblasts (of mesenchymal origin) fail to function normally and abnormal dentin is produced. Gums become spongy and necrotic because of capillary failure. Rarefaction of the long bones occurs, frequently accompanied by separation of the head of the bone from its shaft.

Extravasations of blood into the skin and other tissues with consequent production of hemorrhages are attributable to the loss of intercellular material necessary for the maintenance of tissue integrity.

Bessey, Menten and King (5) report that in severe experimental scurvy there is a change in fat distribution in the adrenal glands and that there is fatty degeneration in the heart, skeletal muscles and liver.

Present opinion indicates that ascorbic acid is an essential participant in cellular respiration and that a deficiency of it may disturb various enzyme systems. Protozoa, molds, bacteria, lichens and algae give a positive ascorbic acid reaction which suggests that it is distributed throughout and is essential to all forms of life. Glutathione protects ascorbic acid against oxidation by oxygen and ascorbic acid oxidase. The oxidized ascorbic acid reacts with glutathione, causing the reformation of reduced ascorbic acid and the production of oxi-

dized glutathione. Ascorbic acid is regarded, therefore, as a coenzyme for the glutathione oxidation.

In recent years evidence has been produced to show that ascorbic acid may have a direct effect upon bodily resistance to disease. Several investigators have reported a direct relation between "complement" (a criterion for measuring immunity) and ascorbic acid. Harde and Thomson (6) suggest that complement may contain ascorbic acid as a component since the thermolability of both substances is similar. After histamine shock the content of complement and ascorbic acid was reduced. Injection of ascorbic acid led to a significant rise in complement. Marsh (7) has reported that the complement complex in the blood of the guinea-pig disappears or suffers reduction in titer when ascorbic acid is withdrawn, completely or partially, from the diet, and that the complement titer can be restored to normal by means of a diet rich in ascorbic acid. Ecker and associates (8) have demonstrated a marked decrease in complement parallel with the reduction in ascorbic acid of the serum. Administration of ascorbic acid to scorbutic guinea-pigs increased the complement titer and the addition of ascorbic acid to scorbutic serum increased the titer to normal.

Perla and Marmorston (9) called attention to the fact that skin reactivity to drugs, such as arsphenamine, is greatly diminished in guinea-pigs depleted of ascorbic acid. This is true also of skin hypersensitiveness to poison ivy. Sulzberger and Oser (10) found that large doses of ascorbic acid, beyond that necessary to protect against scurvy, reduced and inhibited the susceptibility of the guinea-pig's skin to experimental sensitization with neoarsphenamine.

Infectious diseases in general seem to increase the requirement for ascorbic acid, lowering the blood level when the intake is not adequate; but there is no unequivocal evidence that this nutrient has a specific rôle in the prevention or cure of any of them. Rinehart, Conner and Mettier (11) found that chronically scorbutic guinea-pigs infected with *beta* streptococci developed arthropathy with pathological changes similar to rheumatic fever and rheumatoid arthritis. Chronic scurvy alone appeared to produce this syndrome. Rinehart (12) suggested that rheumatic fever may be the result of the continued effect of ascorbic acid deficiency and infection. He and his associates (13) found that in acute rheumatic fever the ascorbic acid level of the blood plasma was almost uniformly lowered. Taylor (14) showed that scurvy in guinea-pigs leads to valvulitis and myocarditis.

Opponents of Rinehart's views have pointed out that a significant percentage of rheumatic fever cases appear to be unaccompanied by ascorbic acid deficiency. Moreover, administration of this vitamin in doses approximately twice the probable normal requirement has not resulted in cure of the disease. But, as Rinehart has pointed out, an adequate study of the effect of high intake of ascorbic acid in rheumatic fever has not been made. McCollum, Orent-Keiles and Day (l.c.) say:

> We are without sufficient information concerning variability in ability to utilize ascorbic acid to conclude that present evidence proves the absence of a causal relation between systemic ascorbic acid insufficiency and rheu-

> matic fever. . . . Opponents of Rinehart's views have not established their claims that disturbances in rheumatic fever, as respects ascorbic acid, are of no greater significance than those of similar character observed in other infections. Further investigation may show that ascorbic acid insufficiency is not a specific factor, but it seems very improbable that this nutrient is without some effect in the prevention of rheumatic fever.

At present there is incontrovertible evidence that ascorbic acid plays a significant rôle in protection against diphtheria toxin. King and Menten (15) fed guinea-pigs abundant, protective, and sub-protective amounts of ascorbic acid and gave them subcutaneous injections of diphtheria toxin in various doses below the minimum lethal amount. Animals partially depleted of their ascorbic acid reserves, but showing no signs of scurvy, survived about half as long as animals with normal reserves receiving the same dosage of diphtheria toxin.

Administration of ascorbic acid as a therapeutic measure appears not to affect the time of disappearance of the diphtheric membrane and temperature elevation, nor does it influence the number of fatalities. According to Otto (16), a favorable influence was exerted on hemorrhages, particularly nosebleed. He noted, too, that retention of ascorbic acid was especially great in cases of toxic diphtheria.

In tuberculosis, as in diphtheria, a larger intake of ascorbic acid is necessary to maintain a normal ascorbic acid balance, but there is no evidence to show that large doses of ascorbic acid increase resistance to tuberculosis infection. Heise and Martin (17) showed that the greater the degree of activity of the tuberculous infection the lower the level of urinary excretion of ascorbic acid. Furthermore, they showed that between 55 and 140 mg. of ascorbic acid were required daily by patients with active tuberculosis for the maintenance of a normal urinary level of the vitamin. In one patient 200 mg. daily was not sufficient to cause a normal excretion level in contrast to the 20 to 40 mg. daily required by a normal non-tuberculous adult.

Steinbach and Klein (18) claim that daily injection of ascorbic acid increased the tolerance of tuberculous guinea-pigs to repeated large doses of tuberculin. Greene, Steiner and Kramer (19) fed tuberculous sputum to scorbutic and normal guinea-pigs and found the former more susceptible to ulcerative intestinal lesions of tuberculosis than the latter.

As in the case of rheumatic fever, diphtheria and pulmonary tuberculosis, so in pneumonia and probably all diseases in which an elevated temperature occurs, it appears that the ascorbic acid requirements are markedly augmented.

The rôle of ascorbic acid in lens metabolism and cataract formation is uncertain. Josephson (20) states that the administration of 15 to 300 mg. of ascorbic acid to patients with cataract caused marked improvement within a week. Cataracts caused by poisoning with dinitrophenol were said to respond very rapidly to treatment with ascorbic acid, and other toxic effects of the drug were also ameliorated. Bellows (21) reports that ascorbic acid given with galactose delays the onset of cataract formation in rats and that lens of the

galactose-fed animals contained less ascorbic acid than normal.

Although there is no adequate basis for assuming a relationship between ascorbic acid insufficiency and gastrointestinal ulcers, nevertheless the diets which have been used in treating such conditions generally contain very little ascorbic acid. Archer and Graham (22) showed that 6 out of 9 patients with gastric and duodenal ulcers were in the subacute scurvy state. Smith and McConkey (23) noted that guinea-pigs suffering from prolonged partial deficiency of ascorbic acid tended to develop peptic ulcers which were believed to be similar to those seen in human subjects. According to Stepp (24), bacteria of the coli and paratyphoid types destroy ascorbic acid so that the resultant depletion might be a contributory cause of peptic ulcers.

That anemia occurs in scurvy is well known. It has usually been attributed to general undernutrition and hemorrhage. Mettier, Minot and Townsend (25) state that in adults with scurvy the pronounced anemia often encountered responds neither to large doses of iron nor to the substance potent in pernicious anemia, but can be promptly relieved by providing foods rich in ascorbic acid. Dunlop and Scarborough (26) reported marked blood regeneration after administration of ascorbic acid to a scorbutic subject whose diet contained only 10 mg. of iron per day.

As has been stated previously, the presence of ascorbic acid in any tissue is in some manner associated with the oxidation-reduction system and depletion of this substance in the tissues may contribute to the occurrence of metabolic disturbances. Menten and King (27) showed that guinea-pigs depleted of ascorbic acid and injected with diphtheria toxin showed degeneration of the islands of Langerhans, which was associated with high blood sugar and low glucose tolerance. Pfleger and Scholl (28) reported that in diabetic patients who were not given insulin, the administration of ascorbic acid had no effect on the sugar content of blood or urine, but the combustion of acetone bodies was favorably influenced. When the tissues were saturated with ascorbic acid the action of insulin was noticeably intensified, so that the carbohydrate metabolism could be regulated with smaller amounts of insulin. They state that all diabetic patients, irrespective of the modification of the sugar metabolism, were improved as respects general condition, disappearance of fatigue, and increased vitality, by the administration of ascorbic acid.

The importance of the adrenal glands as sources of adrenaline and cortin and their high content of ascorbic acid in species which require a dietary source of this vitamin and those which do not, has led to reflection on the significance of ascorbic acid in these glands. Wilkinson and Ashford (29) found ascorbic acid deficiency in three cases of Addison's disease. Some increase in urinary excretion of ascorbic acid followed its administration in large amounts by mouth. Excretion of the vitamin fell rapidly when therapy was discontinued. It was claimed that the degree of ascorbic acid depletion paralleled the severity of the disease. Siwe (30) found a high tolerance of ascorbic acid in patients with Addison's disease. The oral administration of 600 mg. daily did not increase the urinary excretion.

Both Siwe, and Wilkinson and Ashford noted that ascorbic acid therapy produced decreased pigmentation but was without effect on the other symptoms of the disease. It appears that in this disease there is an increased need for ascorbic acid due either to increased need *per se* or to increased destruction, as in febrile conditions.

THE B COMPLEX

During the years 1913 and 1916 McCollum and his co-workers demonstrated that in addition to their "fat-soluble A", young rats required another factor which they called "water-soluble B." They suggested that the new factor was identical with the antiberiberi substance, the existence of which had been demonstrated by Eijkmann and his successor Grijns. A number of references in the literature alluded to the probable dual nature of "water-soluble B." Preparations which cured polyneuritis were not always effective in inducing growth in depleted animals, and vice versa. It was not until 1926, however, that Smith and Hendrick (31) offered experimental evidence which definitely established the dual nature of the water-soluble factor. They employed yeast or yeast extracts which had been heated sufficiently to destroy the antineuritic vitamin and found these supplements effective in restoring growth in rats on diets in which rolled oats was the source of the antineuritic vitamin. Thus they demonstrated in yeast the existence of a heat-stable factor distinct from the antineuritic substance.

Goldberger (32) was led to believe, by his study on human pellagrins and on dogs suffering from blacktongue, a condition supposed to be the analogue of pellagra in man, that the heat-stable water-soluble vitamin of Smith and Hendrick was the antipellagra vitamin.

There is still reason to believe that his surmise was correct, although it is now known that there are contained in heat-treated yeast and in such extracts as were then used, several indispensable nutrients, one or more of which is concerned with the etiology of pellagra. To the heat-stable substance he gave the name P-P factor (pellagra-preventive). In England this factor became known as vitamin B_2, the antineuritic factor being called B_1. In the United States it was the custom to speak of the antipellagra factor as vitamin G, with occasional employment of the term P-P factor, and the antineuritic factor as vitamin B.

A dozen or more names have been employed to designate the substance which prevented or cured polyneuritis, the analogue of human beriberi, in birds and mammals. In 1937 the American Association of Biological Chemists, the American Institute of Nutrition and the American Medical Association agreed upon the term "thiamin" as the acceptable designation for vitamin B_1. "Aneurin" is the preferred name in Europe.

In 1926 Jansen and Donath (33) isolated the vitamin in pure form from rice polishings. Its chemical structure was established and within a decade it was synthesized by Williams and Cline (34).

Thiamin in foods withstands ordinary cooking with practically no destruction if the p_H is not more than 7. However, temperatures above 110°C. which may be reached in a pressure cooker, cause progressive destruction. As a general

rule the temperature reached in the processing of canned foods causes very significant destruction of thiamin. Foods cooked or preserved in an acid medium are much more resistant to heat in respect to their thiamin content than those prepared in alkaline media.

The cardinal symptoms of thiamin deficiency are peripheral neuritis, cardiac enlargement and dysfunction, edema, gastro-intestinal disturbances, muscular atrophy and anorexia. An understanding of the physiological rôle of thiamin will serve to explain the production of these symptoms.

The relationship between thiamin and carbohydrate metabolism was noted early in the history of beriberi. In 1914 Funk observed that polyneuritis follows more rapidly if the carbohydrate level is increased in diets deficient in the antiberiberi factor. Recent evidence suggests that thiamin is definitely concerned with tissue respiration, particularly as it relates to pyruvic acid, a product of intermediary carbohydrate metabolism. Collazo (35) showed that the introduction of considerable amounts of carbohydrate into the crops of normal and thiamin-deficient pigeons invariably caused death in the latter but not in the former. More recent studies (36) have shown that thiamin deficiency is accompanied by a progressive diminution in carbohydrate tolerance. Lewinson (37) noted that thiamin deficiency causes a derangement of carbohydrate metabolism which precedes the nervous disturbances and is manifested as hyperglycemia. It seems probable that this derangement of carbohydrate metabolism is due to reduction in the amount of oxidizing enzymes in the tissues or to interference with their activity. Lohmann and Schuster (38) showed that cocarboxylase, an enzyme necessary for the decarboxylation of pyruvic acid, contains thiamin. Since this enzyme increases the *in vitro* oxygen uptake of brain tissue from thiamin-deficient animals it is indicated that the vitamin does play an active rôle in tissue oxidations, and that hyperglycemia, loss of weight, etc., are directly attributable to a deficiency of the vitamin in the tissues.

Peters and co-workers (39) at Oxford University have convincingly demonstrated that thiamin is a catalyst in the oxidative removal of the lower degradation products of glucose metabolism. Sherman and Elvehjem (40), by means of a thiamin-deficient diet which produces polyneuritis in chicks within two weeks, showed that heart and kidney tissue act similarly to brain tissue with respect to pyruvic acid. Moreover, they have shown that the removal of pyruvate injected intravenously into polyneuritic chicks is much slower than in normal chicks. It is of importance, too, to note that methyl glyoxal, the aldehyde of pyruvic acid, has been found in the blood and urine of humans suffering from beriberi and animals on a thiamin-deficient diet (41–43).

Before polyneuritis was produced experimentally in animals by depriving them of thiamin, beriberi was recognized as a disease involving the nervous system. Today it is not clear whether the neuritic symptoms are directly attributable to lesions of the nerves or to functional interference owing to the accumulation of metabolic products, particularly pyruvic acid. It is also worthy of note that appetite failure and

inanition are the first symptoms to develop in thiamin-deficient animals. Inanition alone may cause as marked change in peripheral nerves as thiamin deficiency. One can conclude, therefore, with Wolbach (44) that, "On the whole, it seems best to regard the primary pathologic effects of vitamin B_1 (thiamin) deficiency as not demonstrable at present and to regard all the pathologic changes thus far recorded, including the myelin sheath lesions, as secondary effects."

Changes in the blood composition suggestive of failure in carbohydrate metabolism favor the inference that the heart does not function normally owing to interference with its carbohydrate metabolism.

Human beriberi is frequently accompanied by edema. In all probability dietary deficiencies other than thiamin are related to this condition as emphasized by Youmans (45) and discussed by Wilder and Wilbur (46). Protein inadequacy is probably of considerable importance.

In experimental thiamin deficiency Cowgill and associates (47) noted loss of tone in gastric musculature. This is accompanied by gastric hypochlorhydria according to Cowgill and Gilman (48), who believe that the characteristic anorexia is related to this condition. Observations on rats kept on a thiamin-deficient diet showed that a lack of this essential nutrient produced a marked increase in the volume of the colon, a further indication of the significance of thiamin in the maintenance of intestinal muscular tone (49).

In consideration of the much discussed and widely publicized use of vitamin B preparations in the treatment of gastrointestinal dysfunctions in humans, the following excerpt from McCollum, Orent-Keiles and Day (l.c.) is pertinent:

> Gastrointestinal disturbances are frequent accompaniments of human beriberi but perhaps more attributable to other factors such as intestinal parasites, dysentery, malaria, etc., than to a direct deficiency of thiamin. Cowgill has adequately discussed this aspect of beriberi and he points out that conditions such as amebic dysentery, commonly found in beriberi localities, may constitute the precipitating cause of the deficiency disease. His convincing argument is that beriberians, in many instances, might have sufficient amounts of thiamin in the diet, although at a critically low level, to prevent the disease if they were not afflicted with diarrhea and attacks of fever. The latter increases the tissue requirements for thiamin and the former causes an inefficient utilization of the vitamin owing to its loss in the watery stools.
>
> The evidence at present is only presumptive concerning thiamin in human gastrointestinal dysfunctions. Vorhaus, Williams and Waterman noted beneficial results when 8 cases of gastrointestinal hypotonia were treated with 10 mg. daily doses of thiamin given by mouth.
>
> Without citing further the numerous reports on this subject, it may be stated that the gastrointestinal changes associated with thiamin deficiency have not been completely demonstrated as having direct origin in the deficiency of this vitamin. Nearly all the studies thus far reported have been complicated by inadequacy of other nutritive factors and in practically all instances the sources of thiamin were concentrates or merely yeast, wheat germ, or other such

materials containing relatively large amounts of this vitamin. In conclusion, therefore, thiamin deficiency undoubtedly affects the gastrointestinal tract, causing considerable anatomical and functional changes, but further investigation is needed, using improved test diets and pure thiamin, in order to clarify the problem.

Little definite information is available concerning the specific cause of muscular atrophy in thiamin deficiency. It is probable that this symptom is secondary to anorexia and inanition.

Anorexia is an invariable accompaniment of a thiamin-deficient diet and is one of the first observable symptoms. As pointed out by Sherman (50), the rôle of this vitamin is certainly not that of making the food appetizing "for when the vitamin is given separately the experimental animal will return with appetite to the same food which it had previously refused." Restoration of the desire for food occurs so promptly after the administration of thiamin that it cannot be attributable to repair of structural injuries. A plausible explanation is suggested by McCollum and associates (l.c.): "In thiamin deficiency carbohydrate metabolism appears to be essentially blocked owing to failure in the breakdown of pyruvic and lactic acids. It appears that appetite for food is influenced in some manner by the blood level of intermediates of carbohydrate metabolism. Therefore, it may be postulated, an interference with this essential process, as occurs in thiamin deficiency, causes a loss of appetite."

Other effects of thiamin deficiency include decrease in sex interest in male rats (51), and suppressing of ovulation and decrease in lactating ability in female rats (52, 53). Enlargement of the islands of Langerhans is related by Wolbach (l.c.) to the disturbance in carbohydrate metabolism.

Notwithstanding the need for wholesome skepticism in regard to the indiscriminate administration of yeast and concentrates of thiamin and the pure substance itself, an extensive and impressive literature on "vitamin B" therapy is available. There are several direct experiments on record which support the opinion that typical dietaries of infants and children would be markedly improved by the use of some rich source of thiamin. Bartlett (54) claims that anorexia which is prevalent in early years might be attributable in many instances to an inadequacy of thiamin. Several years ago Schlutz (55) stated: "A complaint for which the child is brought to the physician more often than any other is persistent anorexia with cessation of gain of weight.... A problem is to provide abundant vitamin supply, particularly the water-soluble vitamin B."

Morgan and Barry (56) reported a study of two groups of underweight children 11 to 13 years of age. One group received daily at noon rolls made with 50 per cent wheat germ and 50 per cent white flour. The control group received the usual white flour rolls. The children receiving the wheat germ rolls surpassed those receiving the white flour rolls in weight, height and in other physical indices of health. Elias and Turner (57) found that infants without extra "vitamin B" in the diet had a slightly greater incidence of anorexia than other infants fed supplements of wheat germ and yeast. These and

other similar experiments suggest that thiamin is a significant limiting factor in the diets of many infants and children.

Vorhaus (58) has recently reviewed the subject of thiamin therapy and has indicated the various clinical conditions in which the vitamin appears to be of particular use. Some of the conditions in which it has been employed with definite success are: neuritis associated with pregnancy; heavy metal neuritis, such as lead, and arsenical neuritis occurring during intensive treatment for syphilis; trigeminal neuritis; certain so-called diabetic conditions; certain alleged gastro-intestinal disorders; and various types of anorexia, particularly those associated with long standing illnesses. Weiss and Wilkins (59) and others have observed that thiamin produces striking improvement in certain types of cardiovascular dysfunctions. Joliffe and co-workers (60) demonstrated the value of this vitamin in the treatment of alcoholic polyneuritis, and Means and associates (61) indicated its value in hyperthyroidism. The subject of the therapeutic uses of thiamin has been thoroughly and adequately reviewed by Williams and Spies (l.c.).

Kuhn and co-workers (62), while attempting to concentrate vitamin B_2, isolated from whey an orange-brown dye now known as riboflavin. This substance was announced as representing the most active preparation of B_2 yet obtained and probably identical with it. Booher (63, 64) confirmed the fact that the "vitamin G growth-promoting activity of whey is associated, at least partially, with its water-soluble, yellow, fluorescent pigment." It has been shown that this flavin is an essential nutrient. It appears to have been invariably a constituent of extracts containing the B-complex of vitamins. It is now known, however, that this dye is not the antipellagra vitamin and does not prevent the dermatosis produced by certain faulty diets in rats and chicks, and formerly believed to be the analogue of pellagra in man. It is therefore a misnomer to call riboflavin vitamin B_2 or G.

Riboflavin was synthesized almost simultaneously in two different laboratories (62a, b, c, d).

The relation between thiamin and the enzyme cocarboxylase has been alluded to. It appears that several of the enzymes which are concerned with the oxidation-reduction reactions of the cells are conjugated proteins in which the conjugated or prosthetic groups contain one of the vitamins of the B-complex. The combination exhibits either enzymatic activity or, in certain instances, may be a member of a system which is necessary for the activation of an important enzyme. Riboflavin is a member of the flavin system, an important oxidative chain in the organism.

Warburg (65) has demonstrated that riboflavin is the active group of an enzyme which appears to be present in varying amounts in practically all living cells and tissues. It is an important factor in actuating such cell combustion processes as the oxidation of sugars. Evidence indicates that riboflavin is not synthesized by the animal cell; consequently, it must be supplied by the diet. Hence the collapse of animals depleted of riboflavin is, no doubt, due to cellular asphyxiation resulting from the lack of a cellular oxidation catalyst.

Goldberger and Lillie (66), who were attempting to produce pellagra in the

rat, were probably the first to describe the symptoms of riboflavin deficiency. In the light of today's knowledge, a study of the rations they used shows that the symptoms they described as "rat pellagra" were produced by a multiple deficiency. György (67) first used basal diets devoid of the water-soluble vitamins except for chemically pure thiamin. Addition of riboflavin to such diets produced stimulation of growth in rats but failed to prevent or cure the dermatitis. Hence it is clear that riboflavin plays no rôle in rat pellagra.

Day and associates (68) produced cataract in rats, mice, chickens and monkeys which they attributed to riboflavin deficiency. Other investigators (69, 70) have failed to corroborate Day's observations. It is possible that their rations may not have been completely depleted of riboflavin.

György's (71) most recent observation is that riboflavin deficiency in the rat is often associated with pediculosis and that administration of riboflavin to lice-infested animals is followed by complete disappearance of the parasites. This may be an indication that flavin is essential in the normal sensory acuity of the skin, and if in flavin deficiency skin sensitivity is reduced, the rats are not able to keep themselves free from pediculosis in the manner of normal animals.

Sebrell and Onstott (72) have shown conclusively that riboflavin deficiency produces in dogs "yellow liver", a disease characterized by severe liver damage.

Hauge and Carrick (73), Bethke, Record and Kennard (74), and Norris and associates (75) have demonstrated that riboflavin is an indispensable nutrient for chicks. Without it failure in growth occurs.

According to Dann (76) and Fouts and co-workers (77), treatment of pellagrins with riboflavin was unsuccessful. Recently, however, Sebrell and Butler (78) have presented convincing proof of the effects of riboflavin deficiency in humans. Eighteen women were given a ration known to produce pellagra. Lesions of the lips, angles of the mouth, nose and ears developed in eleven cases. Administration of nicotinic acid was without effect but rapid healing occurred when these patients were given synthetic riboflavin.

By the use of appropriate experimental diets, disorders have been produced in rats, chicks and dogs to which the terms "rat pellagra", "chick pellagra" and "canine blacktongue" have been applied. It should be mentioned that the last named also occurs spontaneously in dogs. It is now recognized that rat and chick pellagra are not analogues of human pellagra but have different etiologies. On the basis of evidence available it is reasonable to assume that blacktongue in dogs and human pellagra are produced by the same deficiency or deficiencies and respond to the same treatment. Liver concentrates which produce a curative effect in blacktongue give a similar reaction in human pellagrins.

Thus it was that in 1937 Elvehjem and associates (79) made a careful study of potent liver concentrates and isolated nicotinic acid. Next they fed nicotinic acid to dogs with blacktongue and discovered that it was remarkably effective in curing this disorder. Almost immediately several workers tested its effectiveness in human pellagra. Strik-

ing improvements were obtained and continue to be obtained. Gastro-intestinal, skin and mental symptoms respond dramatically to administration of nicotinic acid or nicotinic acid amide. Yet in some instances pellagrins, especially chronic cases, do not respond to nicotinic acid therapy. Therefore, as suggested previously, it appears that nicotinic acid is but one of two or more substances essential for the prevention of pellagra.

The animal body apparently cannot build the vitamin from the foods but must get it ready-made. Like thiamin and riboflavin, it is an indispensable agent in the enzyme system and is involved in certain biologic oxidations and reductions.

In spite of these spectacular responses to the new pellagra therapy, and because of the uncertainty regarding the possible complexity of the disease, the essential treatment of pellagra involves improvement of the diet as a whole rather than addition of nicotinic acid only. Thus the following quotation from *The Newer Knowledge of Nutrition* is worth repetition: "It should be emphasized that the administration of nicotinic acid as a supplement to the diet in pellagrous regions, while it may well prevent this disease, is not the most desirable way to meet the problem of pellagra prevention. The pellagra-producing diet, in any country, is deficient in other essential nutrients, and the prevention of this disease will not necessarily, nor indeed generally, insure a satisfactory standard of health."

Several dietary régimes were described which induced in rats a dermatosis that was believed to be rat pellagra. Birch, György and Harris (80) showed that the inclusion of maize in these diets prevented or cured the condition. Human pellagra has been associated for many years with excessive maize eating. Molasses, which is known to be deficient in the human antipellagra substance, is rich in the factor which cures the so-called rat pellagra. Thus it is apparent that rat pellagra is not the analogue of the human disease. Birch and co-workers designate the substance as B_6, a lack of which causes the characteristic dermatosis in the rat.

B_6 has been isolated and obtained in crystalline form by a number of workers. Very recently it has been synthesized by Harris and Folkers of the Merck laboratory (81). The synthetic form has been used by Spies and associates (82). They studied a series of undernourished persons who had clinical evidence of pellagra and beriberi and certain symptoms which are corrected by the administration of riboflavin. Addition of thiamin chloride, nicotinic acid and riboflavin produced clinical improvement in some patients but in others symptoms developed which did not respond to these synthetic chemical substances. The symptoms described by Spies *et al.* included extreme nervousness, insomnia, irritability, abdominal pain, weakness and difficulty in walking. Four persons who had been treated successfully with thiamin chloride, nicotinic acid and riboflavin but who remained on their deficient diets and were now complaining of these symptoms were given injections of synthetic vitamin B_6. All experienced dramatic relief and within 24 hours the symptoms had disappeared and strength had returned.

Ringrose, Norris and Heuser (83)

first observed a pellagra-like syndrome in chicks. The preventive factor, they reported, is distinct from the human antipellagra factor. Lepkovsky and Jukes (84) found that the dermatosis of dietary origin in chicks is due to deficiency of a factor which they called "filtrate" factor. Evidence now available from several laboratories indicates that the chick antidermatitis factor (filtrate factor) is identical with pantothenic acid (85).

VITAMIN K

An excellent summary of the discovery and significance of vitamin K was recorded recently (86), from which most of the information that follows has been taken.

In 1935 Dam of Copenhagen observed that newly hatched chicks maintained on a diet deficient in certain fat-soluble materials, but otherwise adequate in respect to protein, minerals and all known vitamins, suffered from a fatal hemorrhagic disease characterized by bleeding from the pinfeathers, hemorrhages into the subcutaneous tissues and muscles and gizzard erosions. The hemorrhagic tendency in these chicks was associated with, and apparently due to a fall in the concentration of prothrombin in the blood. The condition could be controlled or prevented by administration of a fraction from the fat of hog liver or by feeding alfalfa. The protective, antihemorrhagic factor present in these last-mentioned materials was tentatively named by Dam the "Koagulations-vitamin," or vitamin K.

Vitamin K, or at least substances possessing similar biologic properties, is widely distributed in nature. In the plant kingdom the distribution appears to be confined almost entirely to the photosynthetic portion of the plant, considerable amounts having been found in alfalfa, kale, spinach, dried carrot tops, chestnut leaves, tomatoes and oat sprouts. In addition, vitamin K is found in soy bean oil and some other vegetable oils but it is not present in significant amounts in fish liver oils.

The vitamin can also be prepared from fish meal, rice bran or casein after the extracted material has been allowed to putrefy, bacteria apparently effecting the synthesis of the vitamin under such conditions. Vitamin K may also be produced by bacterial activity in the intestinal tract and is present in the droppings of chicks and in the normal feces of man.

Investigations indicate the probable existence of several closely related substances having antihemorrhagic activity. The isolation of vitamins K_1 and K_2 (87) and the synthesis of closely related compounds (88) have recently been reported. Present methods are not sufficiently specific to identify such compounds, depending as they do on biologic methods alone. The antihemorrhagic properties of any given material can be determined only by its activity on K-avitaminous chicks. Some attempts have been made to establish a unit of measurement for the vitamin on this basis.

The use of vitamin K in clinical medicine depends on the following facts: (1) that in obstructive jaundice and in disease of the functioning tissue of the liver there is a deficiency of prothrombin in the plasma; and (2) that this deficiency represents one manifestation of K-avitaminosis, although the stools of such patients can be shown to contain

TABLE 1

Other vitamin factors

NAME	INVESTIGATOR	EXPERIMENTAL ANIMAL	ASCRIBED FUNCTIONS
B_3—thermostable factor in yeast	Carter and O'Brien	Pigeon	Weight gain
B_3—thermolabile factor in yeast	Reader	Rat	Weight gain
B_4—heat and alkali labile factor in yeast	Reader	Rat	Weight maintenance
B_4—from liver and yeast	Keenan, Kline, Elvehjem, Hart and Halpin	Chick	Antiparalysis factor
B_5—water-soluble, heat and alkali stable factor in yeast and whole wheat	Carter and O'Brien	Pigeon	Weight gain
Factor Y from autoclaved yeast and yeast extracts	Chick and Copping	Rat	Anti-dermatitis
H—water-soluble, from enzymatic digest	György	Rat	Prevents egg white injury
H—heat-stable, alkali-labile	Booher	Rat	Anti-dermatosis
H—heat-labile factor from meat	McCay, Bing and Dilley	Young trout	Growth
Factor W from liver	Elvehjem, Koehn and Oleson	Rat	Growth
Factor U from yeast and wheat midlings	Stokstad and Manning	Chick	Growth
Anti-gizzard erosion factor. Fat-soluble, thermolabile factor from alfalfa and dried kale	Almquist and Stokstad	Chick	Prevents gizzard erosion
Anti-gizzard erosion factor. Water-soluble, thermolabile factor from cereals and pork lung. Connective tissue and chondroiton also effective	Bird, Kline, Elvehjem, Hart and Halpin	Chick	Prevents gizzard erosion
"Grass juice" factor or factors	Elvehjem, Hart, Jackson and Weckel	Rat	Growth and reproduction
Factor from grass juice or young cereal grasses, oats or barley	Hogan and Johnson	Guinea-pigs and rabbits	Reproduction

TABLE 1—*Concluded*

NAME	INVESTIGATOR	EXPERIMENTAL ANIMAL	ASCRIBED FUNCTIONS
L_1 from beef liver freed of B-complex	Nakahara and Inukai	Rat	Reproduction
L_2 from baker's yeast freed from B-complex			Lactation
Chick anti-encephalomalacia factor from vegetable oils	Pappenheimer and Goettsch	Chick, duckling, turkey poults	Prevents lesions of cerebrum and cerebellum. Muscular degeneration and necrosis of gizzard wall
Chick anti-encephalomalacia factor from fat-free Chinese gelatin	Ni	Chick	Prevents encephalomalacia in chicks
P	Szent-Györgyi	Guinea-pig	For maintenance of proper capillary permeability

the vitamin. The deficient formation of prothrombin in such patients depends in part on a failure of absorption of fat-soluble substances when bile is excluded from the intestinal tract, or when the secretion of bile salts by the liver is reduced. There is also another and perhaps a more important factor, namely, the ability of the liver to utilize vitamin K in the formation of prothrombin.

Reports of the treatment of the hemorrhagic tendency in obstructive jaundice have recently appeared from the University of Iowa and the Mayo Clinic. These studies show that a definite reduction in the prothrombin clotting time, an increase in the quantitative level of prothrombin in the blood, and even control of the actual hemorrhagic states can be accomplished by the oral administration of extracts of alfalfa or of putrefied fish meal, together with bile or bile salts. Even in patients presenting marked depletion of prothrombin the control of the hemorrhagic state is possible by the use of large doses of vitamin K concentrates and bile salts. Rapid correction of the coagulation defect has been observed even in the presence of complete biliary obstruction and hepatic injury.

At present little is known of the effect of vitamin K in other hemorrhagic diseases. In the light of present knowledge there is no reason to expect a favorable effect where the prothrombin content of blood is normal. In cases of sprue and in cases of extensive regional ileitis, deficiency in prothrombin because of an insufficient intestinal absorption of vitamin K has been noted, and in such circumstances there are theoretical reasons for administration of the vitamin. Purpuric states, hemophilia and essential hematuria are not affected by K therapy; on the other hand, recurrent hemorrhagic retinitis and certain forms of functional menorrhagia are said to have shown some response.

Indiscriminate use of vitamin K in hemorrhagic diseases of all types should be discouraged, although to date there has been no evidence of any toxic effects

even with very large doses. Until more evidence is available, therapeutic efforts with vitamin K are best confined to the hemorrhagic tendency in hepatic and biliary disease, for which vitamin K appears to be almost a specific.

Vitamin activity has been ascribed to so many substances that subscripts must eventually be employed if alphabetic designation continues in use. The significance of these substances in human nutrition is unknown and space does not permit a discussion of their functions. Hence table 1 has been appended to furnish the reader with a brief knowledge of the "other vitamin factors."

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PRESERVING THE DIETETIC VALUE OF FROZEN FOODS[1]

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THE rapid increase in the consumption of frozen foods is the outstanding change in the food industry since the beginning of the century. From a small beginning in 1925, the cold packing of berries, it has increased tenfold in that field in the thirteen years. The bulk of this pack, however, goes to manufacturers of other foods, preservers, bakers and ice cream makers.

The estimates for the frozen vegetable output in 1933 placed the total output, largely frozen peas, at 2,500,000 lb., which has increased until the total United States output in 1938 was estimated at close to 84,500,000 lb. This consisted of 7,500,000 lb. asparagus, 7,500,000 lb. snap beans, 19,000,000 lb. Lima beans, 5,500,000 lb. corn, 34,000,000 lb. peas, and 11,000,000 lb. miscellaneous vegetables. Washington, Oregon, Utah, Colorado, Idaho and California produced about 30,000,000 lb. of the 1938 pack of vegetables, and probably about the same proportion of the frozen fruit output.

In some respects these enormous increases have had an undesirable effect on the industry. Some of the producers saw what they thought was an opportunity to secure large profits with inconsiderable outlays. Freezing temperatures were available in cold storage warehouses and the preparation of the fruits or vegetables for freezing was similar to that for canning. So, not a few producers prepared their products in one place and froze them in another. Sometimes the distance between the two places amounted to several hours' travel, and too often the material was not kept cool during the trip. The result has been a decided slowing up of the customary yearly increase in production. The momentum of the movement keeps it going, but unless matters mend there will soon be a falling off in consumption of frozen vegetables if the producers of high grade material cannot increase their production and distribution sufficiently to offset the lack of consumers' interest in mediocre material.

It is not an easy matter to produce fancy grades of frozen foods, either fruits or vegetables. If high nutritional values and fresh flavor are to be maintained, utmost care must be exercised from the selection of the seed to the final cooking operation. Not all strains or varieties of fruits and vegetables are satisfactory for freezing. Strawberries are one of the best examples, for only about 10 per cent of the varieties reported on are graded as very good for freezing. Not only is there a difference in the freezing quality of different varieties, but the same variety may react differently with different soil and climatic conditions. One of the major problems of the industry is to find varieties of both fruits and vegetables best adapted to their needs in any particular region. In our work with Lima beans, we find that strains grown successfully in the coastal belt are fail-

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ures when planted in the hot inland valleys. It is, of course, highly desirable to select strains of vegetables for freezing which mature uniformly, so that the crop may be harvested at one time. This permits gathering the crop by machine, avoiding the high cost of hand harvesting.

In addition to the other factors, there are greater differences in the vitamin C content of various strains of the same fruit or vegetable than one might think. Mack, Tressler and King (Food Research, 1:231) found a minimum of .19 mg. to a maximum of .40 mg. of ascorbic acid per gram in different varieties of fresh, mature garden peas, so that the vitamin content of frozen peas might be doubled by proper seed selection. A like difference is found in the flavor products from different varieties.

After a satisfactory variety or varieties have been determined upon, the next step is to see that the fields are harvested at the proper time. A delay of a few hours in harvesting may make a very serious difference in the flavor and vitamin content of the vegetables. Unfortunately it often happens that the vitamin C content of immature peas is higher than it is when they are in the optimum condition for freezing. Mack and Tressler (Food Research, 1:233) found that 11 varieties of peas averaged .06 mg. per gram less of ascorbic acid when mature than did the same varieties picked when immature. There was an additional loss of .07 mg. of vitamin C when the peas were allowed to become over-mature and starchy before harvesting. It must be remembered, however, that the actual weight of ascorbic acid per sample may be constant, the lower proportion being due to the increase of carbohydrate material as the pea matures.

Flavor changes of peas, beans and corn, during maturity, are too well known to need comment.

After the fruits or vegetables are harvested, there can be no let-down in the vigilance of the operators. Both quality and vitamin content are lowered with great rapidity when the material is allowed to stand or is transported during hot weather. If long hauls have to be made to the freezing plant, the product should be iced. Where it is possible to harvest in the late afternoon and haul at night, this will often obviate the necessity of icing. Asparagus, Brussels sprouts and broccoli have been hauled for two hundred to four hundred miles at night without discoverable loss of quality.

As early as 1907, Straughn (Maryland Agric. Exper. Sta. Bull. 120) reported that Stowell's Evergreen corn lost over 25 per cent of its sugar when stored unhusked for 24 hours at 77°F., and an additional loss, bringing the total to over 50 per cent, on standing an additional 24 hours.

Campbell and Diehl (Western Canner & Packer, Oct., 1937, 29:11) have shown that green peas in the pod held for 9 hours at 70°F. suffered no serious loss of quality, and that covering with cracked ice kept them for 24 hours. Shelled peas, however, could be held for but 6 hours, and blanched peas for only 3 hours, under cracked ice. Kertezs and Green (J. Agric. Research 45:6, Sept., 1932) report a loss in total sugars of 30 per cent in peas held at 38–40°F. (refrigeration temperatures) for 20 hours, and a 50 per cent loss of sugar and starch in 24 hours.

Numerous experimenters have shown that considerable loss occurs in the vitamin content of peas when held before freezing. Mack and Tressler (Food Research, 1:235) state that peas held in the pods for 6 days showed almost no loss when stored at from 34° to 48°F. Stored at from 65° to 72°F., however, there was a very considerable loss. Further, there was a great difference in quality between the two lots of peas. Dunker, Fellers and Fitzgerald (Food Research, 2:41) report that on storage of sweet corn at 40°F. the ascorbic acid dropped from .14 to .09 mg. per gram in 3 days; the losses were very slightly greater at 65 to 80°F., the change being from .14 to .08 mg. per gram. Sugar was not determined in this set of experiments, but the loss over 4 days would be very high. Tressler, *et al.* (Food Research, 2:175) report the loss of vitamin C in Lima beans on storage at 32°F. to be slight, and that shelled beans lost more rapidly than unshelled. The temperature of storage was greatly below that to which harvested beans ordinarily would be subjected. Starting with an ascorbic acid value of .40 mg. per gram, the shelled beans lost 11 per cent in one day, 19 per cent in 2 days, and up to 58 per cent in 11 days. Beans in the pod showed but 6 per cent loss the first day to 31 per cent in 11 days.

Thus it is vital to quality and nutritional value to keep vegetables as short a time as possible between harvesting and freezing, and the temperature of the product as low as practicable.

After vegetables have reached the freezing plant, the first operation with the pod varieties is to shell them. This operation is sometimes carried out in the field but more often the viner is near the freezing plant. After vining, the shelled peas or beans are washed, sorted and sized by sieves. Other vegetables are washed and graded. Needless to say, these steps should not be delayed; if any delay is encountered, the products should be put into cool storage or iced.

All vegetables are blanched before freezing. Two types of blanching are in vogue, one using boiling water, the other, steam. Time and temperature vary with different vegetables. Temperature is usually 190–212°F., the time from one to two minutes. Where the lower temperatures are used, the time is increased. Smaller units, like peas, require only a one-minute blanch at 212°F.; larger pieces, like asparagus or broccoli, require 3 minutes; corn on the cob, from 5 to 10 minutes. Blanching is necessary in order to inactivate the enzymes; otherwise products will lose both flavor and color even when stored at 0°F. Care is necessary in the process, for over or under-blanched material lacks quality. There is always some vitamin and mineral loss during blanching. The vitamin C loss is less than might be supposed, however. Dunker, Fellers and Fitzgerald (Food Research, 2:45) report that raw corn on the cob lost 6.7 per cent of its vitamin C on boiling for 12 minutes. According to Tressler, *et al.* (Food Research, 2:175), small Lima beans lost about 50 per cent of their ascorbic acid when blanched in boiling water for 3 minutes. Larger beans lost somewhat less. Fenton, Tressler and King (J. Nutrition, 12:3) show that with Alderman peas, the loss in cooking for one minute in boiling water was about 12 per cent; with the Thomas Laxton variety, it amounted to about 30 per cent. Continued cook-

ing or blanching does not reduce the vitamin content proportionately; after 3 minutes, further losses are not significant.

After blanching, the products must be cooled as rapidly as possible. No greater mistake can be made than to keep the blanched products warm for any length of time. Loss of flavor and vitamins will result. Usually running cold water or even ice water is used for this purpose. The surface water clinging to the vegetables is removed as far as possible so that in freezing the units will not freeze to each other or to the belts. When this occurs, the skins may be broken in subsequent handling.

Freezing takes place in various ways, and provided it is rapid enough, there is little danger of loss of flavor or essential elements.

Packaging usually takes place soon after freezing or in some processes, before freezing. Care has to be taken that no defrosting occurs and it is best to discard any defrosted material rather than run the risk of lowering the quality of the pack.

Now that the product is packed and ready for distribution, another set of troubles begins. The food freezer may have prepared an excellent product, but all of his care may go for naught owing to the carelessness of his transportation or distribution service. Transportation in carload lots offers little difficulty and, even in less than car lots, troubles are disappearing. Retail distribution, however, is the cause of more anxiety. There is entirely too much material being delivered in unrefrigerated trucks. Many distributors fail to understand that a refrozen product never has the quality that it had before it was defrosted. Retailers are prone to leave packages out of their cabinets until they are partly defrosted, and then wonder why the demand for their frozen foods does not keep up.

Frozen fruits are not so troublesome as vegetables. Once frozen, whole, in halves or as purée, they hold up well if properly packed. The best method of preserving seems to be the syrup packs. Covering the fruit with syrup cuts down the tendency to oxidize and preserves the color and flavor better than where no sugar is used. Frozen purée usually contains about 25 per cent added sugar in addition to that contained in the fruit in the natural state. Frozen citrus juices are also on the market; they are excellent products and when properly prepared, contain a very high percentage of their original vitamin C content. The juice is very carefully handled, only stainless steel equipment being used where metal contact with the juice is necessary. The loss of vitamin C is greatly lessened by de-aerating the juice before it is frozen, and the cans are also well filled and are sealed under vacuum. In the near future, with the new types of gas-flow closing machines, it will be possible to close the cans with nitrogen instead of air in the head space.

In closing, one of the great difficulties with which the frozen foods industry has had to contend, is the rapidity of its development. Many concerns saw its rapid rise in popularity and thought they saw the opportunity to ride to prosperity with a limited investment. They did not understand obstacles in the way of successful operation of a freezing plant. Many went blindly ahead, unaware that the information

which they needed could be had for the asking. Others did not heed the advice given and did not take the precautions necessary to the production of high grade material. As a result, a large quantity of mediocre material was dumped on the market and the increase in consumption of frozen foods began to slow up. At the present time, there is a year's supply of frozen vegetables in storage, according to statements in some of the trade papers. The existence of this surplus is certainly due in part to the fact that some poor quality vegetables have been packed by someone and the packing and other production and distribution operations carried on without regard to well known and well founded practices.

THE VITAMIN C (ASCORBIC ACID) CONTENT OF TEN VARIETIES OF WATERMELONS[1]

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COMPARATIVELY few studies have been published reporting the vitamin C content of watermelons (Citrullus vulgaris). Ahmad (1), using trichloreacetic acid for his extraction, found that watermelons contain more than 1 mg. of vitamin C per 100 gm. Giroud, Ratsimamanga, Leblond, Chalopin, and Rabinowicz (2) state that watermelons contain about 4 mg. of vitamin C per 100 gm. Using 10 per cent metaphosphoric acid for extraction Stone (3) reported that watermelons have 7 mg. of vitamin C per 100 gm., whereas the expressed watermelon juice showed 6 mg. per 100 ml. Sung and Chu (4) found that the juice gave results varying from 4.45 to 6.45 mg. per 100 ml. On the other hand Chi and Reid (5) report that the juice varies from 6.5 to 7.5 mg. per 100 ml., and Fujita and Ebihara (6) find 3.3 mg. per 100 ml.

While this paper was in preparation, Floyd and Fraps (7) published data showing that watermelons vary in vitamin C from 2.2 to 9.5 mg. per 100 gm.

Several workers have investigated the varietal differences in the vitamin C content of a number of fruits and vegetables as follows: Tripp, Satterfield, and Holmes (8), and Maclinn, Fellers, and Buck (9) that tomatoes show varietal differences; Levy and Fox (10), that peaches likewise show a varietal difference; Smith and Fellers (11), and Manville, McMinis, and Chuinard (12), that there is a marked variation in the vitamin C content of different varieties of apples; Tressler, Mack, Jenkins, and King (13), that Lima beans show a varietal difference; and Mack, Tressler, and King (14), that there are varietal differences in peas.

Levy and Fox (10) reported more vitamin C in the skin than in the meat of apples. Likewise, Giroud, Ratsimamanga, Leblond, Chalopin, and Rabinowicz (2) found more vitamin C in the peel than in the pulp of oranges; and Rudra (15), that both pears and plums contain more vitamin C in the skin than in the meat. On the other hand, Fujita and Ebihara (6) found that figs have more vitamin C in the inner meat than in the outer. Consequently, in this research, the distribution of vitamin C in the parts of watermelons was investigated.

MATERIALS

The watermelons used for analysis were purchased on the Raleigh, North Carolina, market and all were ripe or nearly ripe when obtained. All analyses were made within two days after the melons were bought.

The preserved and the pickled water-

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melon rind used were prize winning exhibits from the North Carolina State Fair.

EXPERIMENTAL PROCEDURE

Sections weighing approximately 15 gm. were cut from the center (heart) and from the red edible portion one-half inch just under the rind.

The method used for the determination of vitamin C was essentially that described by Bessey and King (16) and modified by Lyman, Schultz and King (17). The sample was ground with acid-washed white sand and 10 ml. of an acid mixture containing 8 per cent acetic acid and 4 per cent metaphosphoric acid. The acid mixture, juice, and pulp was centrifuged for three minutes at 2000 r.p.m. and the extraction repeated twice. The combined extracts, which were almost colorless, were made up to 100 ml. with an acid mixture containing 4 per cent acetic and 2 per cent metaphos-

TABLE 1

The vitamin C (ascorbic acid) content of ten varieties of watermelons

VARIETY	WEIGHT, LB.	DIAMETER, CM.	MG. % HEART	MG. % UNDER RIND	COUNTY	STATE
Tom Watson (high)	34.9	21.6	10.25	5.69	Cumberland	N. C.
(low)	30.3	20.9	8.43	5.47	Scotland	N. C.
Tom Watson (high)	33.6	23.4	6.95	4.97		S. C.
(low)	27.5	21.7	5.79	4.22		S. C.
Stone Mountain (high)		29.7	10.19	6.89	Johnston	N. C.
(low)	26.0	26.8	8.76	5.53	Johnston	N. C.
Dixie Belle (high)	26.7	26.8	10.80	6.67	Johnston	Ga.
(low)	21.7	25.3	7.14	5.92	Johnston	Ga.
Black Gypsy (high)	23.7	19.6	7.95	5.55	Johnston	N. C.
(low)	19.8	23.4	5.67	4.99	Wake	N. C.
Cuban Queen (high)	20.5	23.5	6.97	4.23	Johnston	N. C.
(low)	17.3	22.7	5.04	4.67	Johnston	N. C.
Cannon Ball (high)	34.5	28.6	9.88	5.76	Moore	N. C.
(low)	20.3		7.97	4.64	Moore	N. C.
Georgia Rattlesnake (high)	39.4	22.0	13.70	6.72	Scotland	N. C.
(low)	32.3	24.3	7.28	4.78	Wake	N. C.
Kolb Gem (high)	19.2	26.5	9.18	5.97	Wake	N. C.
(low)		24.5	7.15	6.11	Wake	N. C.
Thurmond Gray (high)	23.1	19.1	9.85	7.27	Johnston	N. C.
(low)	14.9	18.5	6.77	5.45	Wake	N. C.
Irish Gray (high)	20.9	20.0	8.64	6.81	Wake	N. C.
(low)	21.2	19.7	6.82	4.67	Wake	N. C.

phoric acids. A 10 ml. aliquot was pipetted into a No. 3 Diamond I capsule vial and titrated with 2,6,dichlorophenolindophenol (20 mg. in 100 ml.) using a modified Neale-Forbes Titration Assembly. A faint pink which remained for 30 seconds was taken as the end point. The dye was standardized against pure ascorbic acid. The preserved and the pickled rind were analyzed in the same manner.

The liquor from the preserved and the pickled watermelon rind was determined as follows: To 5 ml. of the liquor, 5 ml. of re-boiled distilled water and 10 ml. of acid mixture (8 per cent acetic and 4 per cent metaphosphoric) were added. Ten milliliters of this mixture was titrated.

DISCUSSION

An examination of table 1 shows that the vitamin C content of the heart of the watermelons varies from 5.04 to 13.70 mg. per cent, whereas the tissue immediately under the rind varies from 4.22 to 7.37 mg. per cent.

It is evident from table 1 that no consistent relationship exists between the size and shape of the watermelon and its vitamin C value. The largest melon, weighing 45.0 lb., contained 8.49 mg. per cent of vitamin C in the heart, and the smallest melon, weighing 14.2 lb., showed 6.62 mg. per cent. In contrast, the melon with the highest vitamin C, 13.70 mg. per cent, weighed 39.4 lb. and the melon with the lowest vitamin C, 5.04 mg. per cent, weighed 17.3 lb.

In table 2 the average vitamin C for each of the 10 varieties of melons is shown. It is seen that the Stone Mountain contains the greatest quantity of vitamin C and the Cuban Queen the smallest. The Cuban Queen was the

TABLE 2

The average vitamin C (ascorbic acid) content of ten varieties of watermelons

VARIETY	AVERAGE WEIGHT, LB.	AVERAGE DIAMETER, CM.	ASCORBIC ACID, MG. % HEART	ASCORBIC ACID, MG. % UNDER RIND	VARIETY
Tom Watson (N. C.)	36.6	22.3	9.25	5.64	Long
Tom Watson (S. C.)	30.5	22.2	6.37	4.56	Long
Stone Mountain	23.5	26.6	10.04	6.49	Round
Dixie Belle	25.7	26.1	8.67	5.83	Round
Black Gypsy	21.2	22.0	6.85	5.37	Long
Cuban Queen	21.4	24.3	5.80	5.36	Round
Irish Gray	21.0	19.9	7.59	5.74	Long
Cannon Ball	30.5	25.6	8.51	5.31	Round
Georgia Rattlesnake	31.8	23.1	8.59	5.66	Long
Kolb Gem	20.6	24.9	7.83	5.89	Round
Thurmond Gray	21.5	18.9	8.05	5.51	Long

TABLE 3

The vitamin C (ascorbic acid) content of pickled and of preserved watermelon rind

Juice from preserved rind	0.20 mg. per 100 ml.
Juice from pickled rind	1.31 mg. per 100 ml.
Meat from preserved rind	0.00 mg. per 100 gm.
Meat from pickled rind	1.01 mg. per 100 gm.

only variety which exhibited a rather even distribution of the vitamin. Perhaps this may be due to the fact that the meat is tender and juicy up to the rind.

Table 3 gives the vitamin C content of preserved and of pickled watermelon rind. The low values found are undoubtedly due to oxidation during heating. The vinegar used in the pickled rind accounts for the higher amount of vitamin C found.

SUMMARY

1. The vitamin C content of ten varieties of watermelons is shown.

2. All varieties studied, except the Cuban Queen, showed more vitamin C in the heart than in the section immediately beneath the rind.

3. No relationship exists between the size and shape of the watermelons and their vitamin C content.

4. All varieties contained approximately the same quantity of vitamin C immediately beneath the rind.

5. The Stone Mountain was highest and the Cuban Queen lowest in vitamin C.

6. The preserved and the pickled rind contain little vitamin C.

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SCHOOL LUNCHROOMS—WHITHER AWAY?[1]

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SCHOOL feeding is not a new development. In 1789, school children of Munich were being invited to municipal soup kitchens. Fifty years later the government of France contributed small sums to provide food for children, and ever since the indigent children of France have been fed from public funds. A decade later feeding of school children was commenced in England. It has spread rapidly throughout Europe, and is now a common practice from Holland to Vienna. In Europe the practice has generally been to feed all children, indigent and otherwise, alike.

In this country progress has been along different lines. It is true that in the early 1850's New York City fed children attending its industrial schools in order to encourage their attendance, but thereafter, aside from a short period in the depth of the recent depression, there has been no feeding of indigent children at public expense. In fact, until shortly before the opening of the twentieth century there was little school feeding even at the expense of the individual parent. The lunch pail from home was the medium of early child feeding in the schools of America.

The first development of school feeding in America was without rhyme or reason. It just grew. The Boston School Committee in 1894 took a controlling hand and directed and served from a central kitchen, a practice which continues to this day. In Philadelphia in the same year the Star Center Association, later to be followed by the School Lunch Committee of the Home and School League, undertook the feeding of elementary children, while high school students were left to the tender mercies of profit-making concessionnaires.

In Cleveland in 1893 concessionnaires took on the task of feeding school children. The Chicago School System commenced operation of lunchrooms in 1902, and was followed in the same year by Rochester, New York, and St. Louis, in all of which concessions were awarded to commercial establishments.

It did not take long, however, for the realization to grow that the hit and miss method of such operation was not accomplishing desirable results. The International Congress on School Hygiene in 1913 gave the first marked impetus to a more scientific approach to this highly important function of those responsible for the health and success of the children of America. It soon became apparent that the unregulated offering of food as practiced, was scarcely a proper supplement to the food offered to the child at home and in his lunch pail. School people became nutrition conscious.

To accomplish satisfactory regulation of production and selection of food some kind of control was necessary. Rapidly from 1909 to 1920 school systems took over the operation of the school lunchrooms and moved toward a centralization of the entire school feeding in a department through which the school authorities might put into effect general

[1] Read before the General Session, American Dietetic Association, Los Angeles, August 29, 1939.

policies of feeding and might obtain the advantage of larger scale buying and production. It speaks well for the educational authorities that throughout this development the interest of the children has always been foremost.

From 1920 to the present date there has been a still further tendency to central control and management. Even in most of those schools where the principal has direct responsibility for the operation of the lunchroom in his individual school, the governing boards are superimposing a central office with merchandising and dietetic control from that point. Formerly, where outside agencies, entirely dissociated from school personnel, were operating cafeterias, the school personnel are now gradually taking over the activity. Concessionnaires, fortunately, have been almost entirely eliminated.

The business administration of the school lunchroom has gone far, but has still farther to go. Responses from 173 school districts over the entire United States show that 128 districts now operate through central lunchroom administrations; 24 are operated by the principal of the school without any control from school headquarters; 15, by cafeteria or lunchroom associations entirely dissociated from the school administration; 4, by student bodies; and only 2 by concessionnaires. The trend is definitely to central office control.

In purchase of foodstuffs much improvement is needed. The nation-wide survey indicates that only 40 per cent of the lunchroom organizations purchase canned goods, bakery goods, milk and ice cream by yearly or semi-yearly bids and contract, and only 20 per cent so purchase meat, butter, eggs and cheese. The others describe their methods of purchasing as follows: "Each cafeteria buys directly"; "Wholesale houses furnish us on daily purchases"; "We buy on quality, price and service"; and "We buy in the open market". Such methods indicate a lack of appreciation of the advantages to be had from large scale purchasing. Much better prices can be obtained on canned goods if the purchase is made at the time of canning. A bakery can afford a better bid if it is to be awarded a contract for a period of time, since it can then protect itself on wheat. In a similar manner, advantage may be gained in contract purchase of milk, ice cream, meat, butter and eggs.

Accounting methods need improvement and standardization. Only 83 per cent of the lunchroom systems make a monthly report of operations. It is unthinkable that any business, much less a public business, should be operated without a monthly operation report, for true progress cannot be made without the information thus obtained. Monthly reports showing the proportion of costs going respectively into food materials, labor, general expense and direct expense, should be made by every lunchroom system.

Financial management faces many problems of which time does not here permit discussion. Depreciation reserves may well be cited as an example. In the 173 questionnaires, only 26 answered the question as to such reserves. Seventeen, or approximately two-thirds of those answering, based their depreciation reserves on percentage of profit, and only 9 based them on value of equipment. Such a situation is appalling. The amount to be written

in the depreciation reserves bears no necessary relation to profit. It needs no argument to prove that the reserve charges should be on the basis of the value of equipment in use. Careful thinking needs to be devoted to financial management.

Accounting methods should provide more information on the respective quantities of different items of food consumed at the various lunchrooms. The questionnaire indicated that only 34 per cent keep such records. There are many economical methods of gathering this information so important to good operation. In the last two decades the school lunchroom has improved rapidly in its business technics, but there are many business devices of which it has not yet availed itself.

In the field of dietetics there is likewise an extensive opportunity for improvement. No one would seriously suggest today that a school lunchroom system should be operated without the services of a trained dietitian. The day when the child's school lunch was considered merely as a stop-gap in his intake of food has passed. It has today become a regular part of his feeding, and in many cases the most certain and nourishing portion of his sustenance.

The first duty, then, of the school lunchroom is to furnish a sufficiently complete menu from which choice may be made to provide the necessary calories, proteins, carbohydrates and vitamins concerning which you are so well informed. It would be presumptuous for anyone other than a member of this organization to attempt to discuss such matters. It is undoubtedly encouraging to you, however, to know that the public schools of the nation are cognizant of the important part that dietetics should play in the school lunchroom.

The provision of a proper and adequate variety of food, however, is only the first step toward adequate feeding. The problem of proper direction of feeding is more and more being thrust upon the school lunchroom. Furthermore, as the knowledge and understanding of food values and requirements increase, the urge to the application of such knowledge becomes more pressing. In consequence, a conscientious effort is being made on the part of school personnel to direct the child in a wise selection of his food.

The task, however, is far from an easy one. It must be accomplished with the utmost diplomacy and tact. At first an attempt was made to regiment the child in his choice. A teacher or some one else watched the child in his selection and directed it much as a policeman directs traffic. This method does not appeal to the average American child. His resentment is aroused and the result is a determination to exert his prerogative in a matter which concerns his choice of food. Especially is this true after the child reaches the fifth grade. The approach, therefore, must be more subtle. It cannot be satisfactorily effected in a technical or mathematical way, but can be accomplished more effectively by comparisons that are suggestive.

Environment has a profound effect upon the benefit to be derived from food consumption. The digestive system cannot be dissociated from the nervous system. If one eats in a noisy, crowded, hot, or otherwise disagreeable setting, his digestive tract tends to reflect his mental irritation; he suffers discomfort,

and his mental and physical effectiveness are drastically reduced. School lunchroom personnel are conscious of this fact.

Though there are exceptions to the contrary, school lunchrooms in their early development were generally located in those portions of the building that remained after all other activities had been placed. As a consequence the usual lunchroom was a dark half-basement or some corner of the attic. In such a room the floors and walls were often continuously damp and unsightly. The steam tables and other facilities were of the makeshift variety. In this part of the school which should have been the most sanitary and pleasing to the eye were to be found the least sanitary and least aesthetic surroundings.

With appreciation of the value of proper surroundings for an eating place has come a definite improvement in conditions. Cafeterias are now being housed in quarters designed especially for food service. Location is being taken almost entirely from below grade level. Rooms are being designed so as to be well lighted and well ventilated. Ceilings are higher. In the better operated schools a festive air pervades the whole. Progress has been made, but more remains to be done. Acoustical treatment is necessary to reduce noise irritation. Ventilation needs to be improved. More color needs to be supplied. The lunchroom should be a warm and appealing place to which the child is attracted, rather than a cold and unresponsive place to which he is driven only by pangs of hunger.

Formerly it was felt that the cafeteria was practically lost space except for the lunch periods. Lately, however, it has been discovered that if the kitchen is separated from the dining room it may be closed off except for serving periods, and the dining room may be used for study purposes, for music practice, for speaking classes and for numerous other uses. In short, the multi-uses to which the dining room may be put has made the financial outlay for the up-to-date school lunchroom economically feasible.

In addition to the previously mentioned uses of the dining room as dissociated from the actual lunchroom operation, there has been an active attempt recently to relate the operation to the teaching of certain other subjects. In many schools, classes are progressively assigned the task of flower arrangement and the solution of other art problems that enhance the appearance of the dining room and teach worthwhile activities in real life situations. Such activities are a positive stimulus to the youthful mind, much more effective than mere theoretical discussion.

The lunch hour, under the guidance of a resourceful teacher, can be used for the teaching of the social graces. Rotating assignments of different members of a class give each an opportunity actually to participate as host and as guest.

The modern educational program is chiefly concerned with creating life situations in which the child learns by precept and deed. It is felt that under such teaching there is a much greater carry-over into after life. Surely here in the lunchroom is an opportunity that should not be overlooked by the progressive teacher or educational system.

As was stated at the beginning of this discourse, in this country there has been

but little feeding of indigent children at public expense. The depression gave the first impetus to a widespread and general attempt to meet this need. During the depths of the depression the federal government and state agencies undertook a rather extensive program which has been generally relaxed as the acuteness of the financial stress lessened. However, the seed thus sown has never entirely died out. With the recurring periods of acuteness, the need is gradually gaining a fixed place in public consciousness. The feeling is growing that the state, because of its interest in the welfare of the child—the future bulwark of our nation—is as much concerned with his physical condition as with his mental well-being. Physiologists and psychologists proclaim that a physically undernourished body cannot be mentally and spiritually alert. Consequently a minimum program of feeding becomes the right of every child equally as much as a minimum program of education. Such a theory has far-reaching implications, favorable or otherwise, depending in a measure on the individual philosophy of government. The problem, however, cannot be overlooked. The California Legislature at its 1939 session enacted a law making it legal to expend public funds for furnishing breakfasts and lunches to indigent children. The practice, whether expanded throughout the nation or not, is going to demand public attention and will require an answer.

And so, school lunchrooms—whither away? To a more energetic and systematic business control and direction that will afford improved practices with better food at less price; to a more enlightened dietetic appreciation that will result in a better balanced offering of food coordinated with the home feeding of the child; to a more effective food selection that will develop a keen and alert body and mind which will carry over into adult life; to a more adequate housing of lunchrooms that will not only improve the nutritive value of food intake, but will afford a place where beauty and social graces may be more effectively taught in real life situations; and to the assumption by the school lunchroom of that proper place—whatever it may be—in the feeding of indigent children at public expense.

Truly, the school lunchroom faces a real challenge.

THE DIETITIAN IN THE SCHOOL LUNCHROOM[1]

LUCY W. PARSONS

School Lunchroom Department, Board of Education, Detroit

WHEN I was eight years old, my mother began allowing me to make little biscuits and cookies. Shortly after that the Girl Scout magazine, *The American Girl*, published a series of articles on choosing a career. One of these was entitled "The Dietitian". It began in some such manner as this, "Do you like to cook? If so, you should be a dietitian." That settled the matter for me.

For a number of years that limited conception of a dietitian remained with me. With the advent of college, and more particularly the year as a student dietitian, the horizon widened. For many years the general opinion of home economists in regard to the school lunchroom as an opportunity for a dietitian was about as narrow as my own early conception of dietetics in general. The last decade has brought about a rapid change in this idea, however, and today we find the school lunchroom developing into a first-rate field for the dietitian. Almost every professional journal related to foods or institution work has recently carried articles on the subject. The federal government has taken an interest in it, as evidenced by a recent issue of the *Consumers' Guide* and a new series of illustrative materials to be used in school feeding centers.

An investigation of the scope of school lunchroom work shows that in training required and duties it is quite similar to other forms of institution administration. Postgraduate training courses for the administrative dietitian are given at Florida State College for Women, Washington State College, University of Texas, Women's Educational and Industrial Union of Boston, and by the Board of Education of Detroit. The postgraduate training period varies from nine months to a year.

Probably the school lunchroom course as given in Detroit under the supervision of Winning Pendergast is most typical. It is open to home economics graduates of recognized colleges and universities, only those graduates majoring in institution management being considered. The course covers ten months, during the first five of which the student has practical experience in various sizes and types of lunchrooms, doing the work of the various employees. Much of the time is spent in actual food preparation as a basis for the future training of her own employees. During the second half of the apprenticeship, she serves as assistant manager in one of the large schools where she assumes more and more of the duties of manager. She has a chance to acquaint herself with the relationship between the lunchroom and the school as well as with the central lunchroom office.

The qualifications of a satisfactory lunchroom dietitian have been described as follows: an interest in and knowledge of foods and nutritive requirements of school children; superior physical health and energy; appreciation of high professional standards; understanding of methods of food purchasing, preparation, service and cost control; a tactful, intelli-

[1] Received for publication July 11, 1939.

gent, and forceful attention to personnel management; and high standards of sanitation. Surely these are the same qualifications looked for in the student or staff dietitian in all branches of service.

The scope of work in the field of dietetics can easily be grouped under the headings of our national association sections: administration, diet therapy, community education, and professional education. All these interests have application to the work of the school lunchroom dietitian.

If you are a dietitian primarily because you like administrative work, then I challenge you to find an opportunity for your skill wider than that of the school lunchroom. To begin with, the personnel problem involved is unique. Since only one meal a day is served for five days a week and forty weeks a year, the annual income of the lunchroom employee is not large, even though the hourly rate is reasonably high. As a result, the work is most satisfactory if the worker can supplement this wage in other ways. For this reason the majority of our employees are housewives who usually come to us with only a housewife's training and speed. More of the dietitian's time and knowledge is required to train these people than the average commercially trained employee.

The essentials of menu planning for the lunchroom differ as well. Our customers have a very short lunch period, therefore the display of food must be limited enough each day for quick selection. The necessary variety must be effected from day to day. Our customers are young and likely to be very critical of food. We must be able to encourage the sale of protective foods, which at this age are apt to be so unpopular. This means attractive displays or combinations of protective foods with popular items. Much skill is required of the menu-maker if she is to keep her youthful clientele eager to come to the lunchroom. Since we have a comparatively simple menu pattern, different types and arrangement of equipment are necessary. This requires constant study and planning on the part of the dietitian. Our own department has an equipment committee constantly working, with the aid and suggestions of all managers, on kitchen and lunchroom lay-outs, types and quantities of equipment, etc.

Our food prices are low and our clientele not only constant but at a very formative period in life. Therefore, recipe testing is another department in which we use specialized efforts. In addition to the work carried on by individual managers and coordinated by a recipe testing committee, all recipes are given a final testing and cost analysis at the lunchroom department's testing kitchen, maintained in one of the schools.

Perhaps you are particularly interested in the financial wizardry of dietetics. The establishing of a favored accounting system in the lunchroom could be a full-time job for the dietitian. With a definite percentage ratio between the food cost, payroll and receipts, very interesting charts or graphs can be worked out to show at a glance the rôle of the various items in a successful organization. Since we aim to have a high food percentage, constant time and efficiency studies must be made so that our payroll will not exceed its proportion

of the receipts. Costs of individual recipes or food items are calculated almost daily. In other words, the lunchroom dietitian is individually responsible for the financial end of her non-profit, self-sustaining organization.

In addition, the lunchroom manager is concerned with working schedules and time studies, sanitation charts, dishwashing and other cleaning compound studies. In short, the administrative dietitian can find almost unlimited scope in which to apply her specialized abilities in the school lunchroom.

If you are most interested in diet therapy and have the enthusiasm of the nutritionist, I invite you to watch with me as the line of students goes by the counter. The too fat ones with their trays showing a too bountiful supply of mashed potatoes, potato chips, ice cream and cake, followed by the too thin with their dainty salads and fruit juices, will make you eager to do something drastic. But when dealing with the sensitive nature of youth, the school dietitian must be a diplomat and a psychologist.

All of which leads me to those of you who have pedagogical tendencies. Are you a "natural born teacher" and eager to engage in teaching opportunities offered in the dietetic field? If so, we are the very group you seek. Our community education work can be practically unlimited. We have merely scratched the surface so far. Some of the things we are attempting at present in order to develop better food habits are as follows:

1. The arrangement of the counter display so that the hot foods and protective foods come at the beginning of the counter, thus preceding the more popular but less desirable desserts and sweets.

2. The promotion of the sale of desirable foods by enticing price adjustments or by combining them on hot plates, special lunches, etc. with more popular items.

3. Extensive and ever-changing use of posters.

4. Checking and grading of trays with special recognition for well chosen ones.

5. Education through the school paper, school radio, assemblies, home economics clubs, etc.

6. Use of sample trays near the entrance.

7. Use of food or white rat experimental displays.

In addition to the teaching done immediately in the lunchroom, the school lunchroom dietitian can play a large part in community and school education as a whole. Interesting the parents in the lunchroom soon brings returns in better cooperation with your department. The encouragement of school parties in the lunchroom arouses more interest among the students.

There are many ways, as have been indicated by Miss Pendergast, in which the lunchroom can cooperate with other departments in the school in developing better food habits. The home room can play a part by making and discussing lists of popular foods to be submitted to the lunchroom dietitian. The discussion could be developed along the lines of the relationship of these foods to growth and health. The art department can help by making posters promoting the sale of desirable foods. The English department can write interesting bits of information about various food items on the menu which may be mimeo-

graphed and passed out on the trays. Also these same items can be used as subjects for themes. The health education department can assist by preparing graphs and charts showing the relationship between foods and growth and health. The home economics department can do much to sponsor or recommend desirable selections in advance of the menus. The mathematics department can use the percentage ratio of various items to the receipts for preparing graphs. They may also take and figure inventories. The biology department can set up food exhibits or white rat exhibits, showing the effect of diet on growth and development. In other words, the dietitian can make herself a very vital and central part of the school.

From a professional education standpoint, the various training courses going on in school lunchrooms offer the dietitian quite a challenge. In our own system at present three distinct training courses are being carried out in various schools. In addition to the previously mentioned course for prospective managers in the secondary and high school lunchrooms, there is a similar course for the managers in the elementary schools and one for cooks in the secondary and high schools.

All three of these training courses are carefully outlined and supervised by Miss Pendergast. The managers in whose schools the training is maintained have an excellent opportunity to develop the department as a whole. The interest and leadership they demonstrate to the trainees go far to promote the high standards and aims of dietetics throughout the system. As with all teaching, the teacher usually learns as much or more than the pupils and thereby finds herself stimulated to learn more about her work.

EDITORIAL

THE AMERICAN CUISINE

There are some who look to America, that melting pot of nationalities "from which we will cast the better state", as the land that will also see the final and perfected fusing of the culinary arts of many lands. While our gastronomic development has had to weather many dietary isms and cults, our progress is evidenced by many commendable regional dishes and fairly typical cuisines which need not take second place with the dishes characteristic of other nations whose culinary artistry has been perfected through generations of effort.

This country has one great advantage, for within the borders of these United States we have the soils and climates which produce a diversity of foods, and a means of transportation and storage which brings these foods to our kitchen with most of their intrinsic goodness intact. We may not have the exact counterpart of the piscine elements that the French put into their *Couquilles St. Jacques*, the *Bouillabaisse* of Marseilles, or the *Moules Marinières* which any French cook worthy of the name can bring to the table unashamed, but if we draw on our coastal products of the East, West and South, we have quite acceptable substitute makings for these dishes.

In the engaging book *Fit For a King*,[1] Merle Armitage points out some of the gastronomic delights that await the epicurean palate. Witness the chowders and the shore dinners of the New England coast; the pies and hot breads of Maine; the Northwest with its fruits and salmon and Tillamook cheese; California where the perfect salad, green, succulent and crisp reaches perfection; and the South, where a blend of French, Spanish and traditional colonial lavishness, mellowed by time and the innate skill of the negro cook, has devised a cuisine distinctive and unsurpassed in any older land.

Mr. Armitage believes that Ohio, Indiana and Illinois comprise the center of the true provincial cooking in America. We would include three other corn states, Iowa, Nebraska and Missouri, where fried chicken, corn-on-the-cob, fluffy mashed potatoes, and sour cherry pie are supreme. Many of the dishes, however, which distinguish certain other regions, are entirely European in concept, and a great deal of that which can be truly characterized as American cooking was devised for an earlier generation whose pre-meal activities consisted of strenuous outdoor work.

Thus in America we see the influence of many nations and races in our cookery, and in the larger cities it is possible to taste the proudest concoctions of the French, the Swedish, the Italians, the Chinese, and others. As Mr. Armitage has said, all this gives us a range, a breadth of possible menus, and a variety of cuisine unknown in any other country. And only in our time has the world had such sanitation, refrigeration, mechanization, and proper equipment for the gastronomic arts. Thus he concludes that the future of gastronomy in America is very bright, and "the golden days of epicurean food are ahead, not behind us."

[1] McGehee, R.: Fit For a King: The Merle Armitage Book of Food. New York: Longmans, Green and Company, 1939.

METHOD AND MAGIC IN MENU-MAKING[1]

By your service you may choose your clientele. You may have fine food and luxurious service, catering to a discriminating group with money and leisure, or you may service a quick lunch to supply the business neighborhood. You may build your business on a specialty which may be noted from coast to coast; it may be a chicken dinner, black bean soup, cheese cake, planked steak platter or salad bowl, or an unusual doughnut or sandwich shop. The choice is yours.

In a hospital institution or residence hall the guest is a steady customer who dines with us once, twice or three times daily. Many times there is little or no choice on the menu, a table d'hote usually being served. The satisfaction of these guests is our particular concern. Not only must we supply good food at a reasonable cost, but we must also supply a menu which is varied and interesting, one which daily will bring food satisfaction to the guest who has been dining with us over a long period of time, perhaps years.

Variety is the spice of food as well as of life. To secure this desired aim one does not slight the old standbys on the menu but it does mean that new dishes must appear occasionally and the old dishes must be served in a varied form with new combinations or at a different or unsuspected time and not be repeated too often, even though they may be popular.

To assist in planning this varied menu, the Nutrition Department of the New York Hospital has prepared a Menu suggestion and Check List, which has been compiled from menus served in this department over a period of six years. All suggestions are listed according to types of food, as follows: appetizers; soups and accompaniments; entrées; meats, poultry and fish; garnishes, relishes and sauces; vegetables; biscuits, muffins, batter cakes, rolls and bread; cakes; eclairs; cookies; pies; tarts; pastries; puddings; frozen desserts; dessert sauces; salads; salad dressings; cold plates; beverages; and sandwiches.

In these lists are approximately two thousand food items, and more are added weekly. For a suggestion list is always open to more suggestions. The list serves as a check on the variety of food offered and the frequency of service. A check space is provided for all items covering each week for a six-month period. There are twenty-six check spaces after each food item. By checking all food items served each week it is possible at any time to know exactly what has been served before and when it was served, and all this plus prevailing food prices and seasonable items on the market, determines what should be served on the coming week's menu.

Thus, a glance at the suggestion list may show that chilled grapefruit juice and apricot nectar as a fruit juice cocktail was served last week. We may be seeking a refreshing, economical appetizer and can choose either lime juice cocktail with raspberry sherbet or per-

[1] Abstract of an address by Margaret Byrns, dietitian, The New York Hospital, presented before a meeting of dietitians and food service directors, at the National Hotel Exposition, Grand Central Palace, New York, November 13, 1939. Copies of the "Menu Suggestion and Check List" are available at 50 cents, on application to the Nutrition Department, The New York Hospital, 525 East 68th St., New York.

haps a grape and gingerale cocktail with lemon sherbet. For soup we could serve split pea soup with saltines. But it is likely that the guests would be more pleasurably surprised if the soup were garnished with buttered toasted croutons, whole salted almonds, or a garnish of whipped cream topped with paprika.

It is that element of surprise that enlivens the menu and makes the old standbys we all like and depend upon so much, seem new and something of a pleasant gastronomic adventure.

Roast beef is a favorite of all. A sprig of parsley or even a radish rose may become a tiresome garnish. There are so many attractive garnishes we might use: spiced melon with sliced stuffed olive on a sprig of parsley; or a garnish of delicious whipped cream and fresh grated horseradish in a crisp lettuce cup topped with a slice of red radish. Other garnishes and relishes which will make a new and delectable dress for roast beef might include chutney sauce, beet and horseradish relish, Philadelphia relish, or sliced tomato topped with piccalilli in a lettuce cup.

Do you always serve mint with roast lamb? If you *must* serve mint, consider a pineapple mint marmalade in a lettuce cup. Or why not add fresh mint to the potatoes served with the lamb—fluffy mashed potatoes with chopped mint and cress or "Savory Potatoes" as they appear on the menu. Or forget all about the mint, if you can, and try currant jelly on golden orange slices, or a half pear sprinkled with Parmesan cheese toasted and served hot, either of which will dress up any dish of lamb. And instead of plain brown gravy or mint sauce, why not a delicious mushroom sauce?

An ice cream tart for dessert is a delight to the eye as well as to the palate. Simply prepare tart shells, fill with ice cream and cover with chocolate, butterscotch or fruit sauce. Cheese, crackers and guava jelly is another old favorite and so easy to serve. In the summertime when fresh fruit is at the peak of the season we serve individual dishes of Swiss Gruyere cheese, toasted saltines or rye krisp, with a fresh plum, a peach or a small bunch of white grapes. It makes a picture as well as a perfect dessert. You will find that your men guests or medical staff will delight in an assorted fruit and cheese tray from which they may take their pick.

It is not always the new dishes that please our guests. It is usually that good old standby served with a new garnish in a new fashion or with a new combination which gives variety to our menus and satisfaction to our guests.

A NEW COLUMN OF INTEREST TO THE ADMINISTRATOR

Beginning with this issue, Mary W. Northrop, dietitian and housekeeper, The King County Hospital System, Seattle, and member of the Journal Board, will direct a column entitled "Have You Heard?" which will appear at the end of the news section.

The value of this column to the membership is dependent upon the response of the members. Contributions from the members of the American Dietetic Association will be welcomed and appreciated. Information about new equipment and new food products, shortcuts to save time or money, or ideas which may be useful to other dietitians, may be sent to Miss Northrop or the JOURNAL editor, marked for the "Have You Heard?" column.

CURRENT COMMENT

THE PAY CAFETERIA[1]

MARY M. HARRINGTON

The pay cafeteria for certain divisions of the hospital is not new. However, the idea of giving all of the staff and personnel of the hospital a straight salary, and permitting them to purchase their food at a low price, is still in the experimental stage and merits much study. This development in hospital food service produces a sociological and economic change in the attitude of the hospital toward its employees.

The hospital personnel had formerly been considered as a family group, which had been provided with food and shelter or "maintenance". Every effort has always been made by each institution to provide optimum maintenance within the financial allowance available for this purpose. Members of the staff and employees had individual evaluations of maintenance, and the amount of money spent for this purpose often far exceeded its recognition and appreciation by the recipient.

American civilization has emphasized the virtues of individuality and the individualistic philosophy demands self-expression and self-realization. The habit of eating manifests itself at regular intervals throughout the day and it is natural that the need for self-expression becomes exaggerated at these times. Familial food habits, state of mind and many other factors determine the reaction to the menu presented. The hospital worker often resents the menu offered to him as part of his maintenance and would prefer to select the foods he desires.

Dietetic departments have long felt that greater satisfaction could be attained with a marked reduction in food waste and complaints if the responsibility for food selection were placed on the individual. After much study at Harper Hospital, it was decided to give every employee of the institution an adjustment in salary and leave full responsibility for meals to the individual.

In May 1938, two pay cafeterias were opened to accommodate employees who wished to buy all or part of their food and to provide dining rooms for this purpose. These units were to be self-sustaining, non-profit and so planned as to offer a reasonable variety of attractive food in an interesting, attractive environment. This plan has been enthusiastically received and appreciated. The total amount of money spent for raw food has decreased, special diets have been eliminated and food complaints have been markedly reduced.

Before the change in the type of food service, a talk was given by the dietitian (to the various groups) to emphasize the foods necessary in the daily diet to ensure optimum nutrition. Budgeting the food allowance was also discussed in detail. In the employees' cafeteria, it was felt that further education as to good food habits should be an objective and the practice of giving a bread and butter sandwich of whole wheat or white bread free with each purchase of a glass of milk might and did increase the consumption of milk and at the same time provided extra calories. This addition of bulk and energy would enable the employee to have more money

[1] Presented at the Tri-State Hospital Association meeting, Stevens Hotel, Chicago, May 3, 1939.

to spend for fruits and vegetables. Some of the employees bring part of their lunch and purchase soup, beverage, dessert or salad in the cafeteria. Prices in the employees' cafeteria average slightly lower than in the other cafeteria for the same size portions. This seemed a fair consideration in relation to their salary adjustment. The distribution of the food dollar was analyzed to study any change in the nutritional intake of these people. The consumption of milk, cheese, fruits, vegetables and cereals had increased but the amounts of butter, meats and accessories had decreased. It is evident that the self-selected diets had not lowered the nutritional intake, but apparently had increased attention as to proper food selection.

The best practices in commercial cafeterias, school lunchrooms, hospital and other institutional cafeterias were studied. Standard serving portions were used and the selling prices determined on the basis of raw food cost plus the overhead and payroll which had previously been charged to the department. These prices were checked against prices in other non-profit types of cafeterias and were considered fair and reasonable. All articles were priced individually and combination foods have been used in only a few instances (asparagus tips on toast with a cheese sauce is one example). Plate combinations and specials have been avoided on the basis of advice from dietitians more experienced in this type of service. Our experience with the few combinations which we have used has served to convince us of the wisdom of their advice. The consumer either wants two portions of asparagus and no toast, or no cheese sauce and a lower price. Perhaps it is because our particular clientele has become accustomed to certain combinations and therefore wishes a change, but the practice of selling each food separately permits the guest to select any combination he desires. Each food carries its own service cost and only in rare instances is one food priced higher to offset that of another.

This change in food service to personnel necessitated many changes in food control and the cost accounting of this department. Before the change, the dietary department used 21 per cent of the hospital operating dollar. During the first year of this new system, 22 per cent of this operating dollar was used but this figure included many charges which formerly were listed under other divisions. The hospital income dollar showed 5 per cent increase from the dietary department in the nine months of operation under the "pay system". The raw food cost for 1938, corrected for market decrease, showed a reduction of 2.9 per cent.

The number of meals served to employees decreased 16 per cent and most of this loss was divided over the morning and evening meals due to people eating at home. The decrease was greater in the employees' cafeteria than in the staff dining rooms, but the number served at night supper decreased from 120 to 40. The number of guest trays was lowered 51 per cent and the daily average of guests served in the dining room was 170, divided almost entirely over the noon and evening meals.

In 1937, the operating dollar spent by the dietary department showed 72 per cent for food, 24 per cent for payroll and 4 per cent for expenses. In 1938, 59 per cent was spent for food, 33 per

cent for payroll and 8 per cent for expenses. The total increase in the number of employees in the department was six, and the new jobs created were for three cashiers, a food checker and a food accountant.

The average check per day in the employees' cafeteria is $0.41; the nurse's check averages $0.63; intern's, $0.772; and the average guest check is $0.82. The total average sale per day is $0.64. The average breakfast check is $0.132; luncheon is $0.261; and dinner $0.255.

The food cost ledger must show a very clear distribution of the food dollar. The raw food cost is maintained at 40 per cent of the sales dollar; depreciation is estimated over a 15-year period. Replacements of china, glassware, silver, linen, utensils and other maintenance items are charged each cafeteria.

This plan has been in operation for nine months and while it is not the answer to a dietitian's prayer—"a solution to the problems of feeding people"—it has solved so many and given so much satisfaction that favorable comments far exceed anything we could have anticipated. Foods which were very unpopular in the old system are among the best sellers now. Lamb, liver, chili, macaroni and similar foods, for instance, are highly respected and increasing in popularity.

The type of meal selected by the various groups is interesting. Men often choose tomato juice, a large salad, hard roll and a glass of milk for luncheon. Fruit combinations in salads seem more popular than vegetables, with the banana rating as the more popular fruit, and lettuce and tomatoes as the vegetables most commonly sold.

The employees' cafeteria is individual in its preferences and layer cake is quickly sold out, but the same cake served as drop cakes or cut in squares does not sell.

The responsibility for a special diet rests on the individual after proper dietary instruction. During the teaching of the diet, a budget is planned so that variety may not be limited and the amount of money allowed for food may be adequate for the diet.

A tea-room is open only when the dining rooms are closed and late breakfasts and light lunches may be obtained by personnel and by guests of patients. This room has been open only a few months but is becoming very popular.

AMERICAN DIETETIC ASSOCIATION EXHIBIT, AMERICAN COLLEGE OF SURGEONS

ANNA DEPLANTER BOWES

Members of the Philadelphia Dietetic Association arranged and were responsible for the exhibit sent from the Chicago office for the meeting in Philadelphia, October 16–20. A special effort was made to have only American Dietetic Association members and those engaged in metabolic work at various hospitals in attendance at the booth.

Some of the questions asked by those visiting the booth concerned: requirements for membership in the American Dietetic Association, what we are doing toward standardization of the soft and selective diets for all hospitals, and what publications are distributed by the American Dietetic Association and where these could be obtained.

Others requested such information as: foods included in a high potassium diet, a copy of a modified Sippy diet,

our opinion concerning the use of the banana milk diet, the amount of milk advised for the seven-year-old, a list of foods containing vitamins A and K, information on vitamin D, the number of calories in the low fat diet (judged to be approximately 2000 calories), and the possible use of honey for rapid recovery from diabetic shock.

Among the pertinent comments made were those concerning the extreme simplicity of the charts displayed; the need of a service for supplying special diets to the general practitioner; a plea for a display of food models or actual foods; and interest in the JOURNAL of the American Dietetic Association.

INSTITUTE ON NUTRITION AND DIET

DOROTHY DEHART

In September, 1937, I received an inquiry from Dr. Thomas P. Farmer, chairman of the Committee on Medical Education of the Council of the Medical Society of the State of New York, who requested suggestions as to what dietitians could do to contribute to the graduate education of the physician. I immediately called together a group of dietitians in New York, consisting of Bertha Biltz, Mary Henderson, Marie Crouse, Henderika Rynbergen, May E. Thompson, Lulu Graves and Dorothy Spence. We met in October and formulated a tentative outline to submit to Dr. Farmer. I then called upon each of the six dietetic organizations in New York State to send me names of their members who were qualified to speak before a medical society. Working with Drs. E. H. L. Corwin, Peter Irving, and George Baehr, at the New York Academy of Medicine, I secured the names of several doctors who would appear on the program.

In the spring of 1938 I gave a report of our activities and plans at the New York State Dietetic Association meeting. I was then appointed as a special chairman of the Professional Education Section of the state association, in order to effect official cooperation between the Institute on Nutrition and Diet and the dietetic association.

The final plans were completed under the supervision of Dr. Farmer and the Council and the Institute was held on four successive Wednesdays from October 18 through November 8 at the College of Medicine of Syracuse University. Marcia Rosbrook and her staff at Syracuse Memorial Hospital who aided in setting up trays and displays needed by the speakers for their demonstrations, deserve special mention. The program of lectures by physicians and dietitians follows:

October 18: General Consideration of Diet, Dr. A. F. R. Andresen, professor of clinical medicine, Long Island College of Medicine, Brooklyn, N. Y.; Nutrition as Related to Tissue Function, Dr. Helen S. Mitchell, research professor of nutrition, Massachusetts State College, Amherst; Diet in Cardiac Diseases and Arthritis, Dr. Russell L. Cecil, professor of clinical medicine, Cornell University Medical School, New York; Diet in Cardio Vascular Diseases and Arthritis, Blanche Bohach, chief dietitian, Rochester General Hospital, Rochester, N. Y.; Diet in Relation to Allergy, Dr. Robert A. Cooke, assistant professor of clinical medicine, Cornell University Medical School, New York; Diet in Relation to Allergy, Mrs. Frances Naylor, consultant in nutrition, Bronxville, N. Y.

October 25: Diet in Diabetes Mellitus, Dr. Charles B. F. Gibbs, assistant professor of medicine, University of Rochester School of Medicine, Rochester, N. Y.; Diet in Diabetes Mellitus, Gladys Hills, clinic dietitian, Presbyterian Hospital, New York; Diet in Obesity and Undernutrition, Dr. William A. Groat, professor of clinical pathology, Syracuse University College of Medicine, Syracuse, N. Y.; Diet in Obesity, Undernutrition, Gout, Frances MacKinnon, clinic dietitian, New York Hospital, New York; Diet in Diseases of the Gastrointestinal Tract, Dr. A. H. Aaron, associate professor of medicine, University of Buffalo School of Medicine, Buffalo, N. Y.; Diet in Diseases of the Gastrointestinal Tract, Ursula Senn, chief dietitian, Edward J. Meyer Hospital, Buffalo, N. Y.

November 1: Diet in Pregnancy and Lactation, Dr. Edward C. Hughes, professor of obstetrics, Syracuse University College of Medicine, Syracuse, N. Y.; Diet in Pregnancy and Lactation, Pauline Murrah, Red Cross nutritionist, New York City Department of Health; Diet in Infancy and Childhood, Dr. Henry L. K. Shaw, clinical professor of pediatrics, Albany Medical College, Albany, N. Y.; Diet in Infancy and Childhood, Helen Monsch, head of Department of Foods and Nutrition, N. Y. State College of Home Economics, Cornell University, Ithaca; Diet in Deficiency Diseases, Dr. Thomas T. Mackie, attending physician, Roosevelt Hospital, New York; Diet in Deficiency Diseases, Dr. Ann Bourquin, professor of nutrition, College of Home Economics, Syracuse University.

November 8: Diet in Renal Diseases, Dr. William S. McCann, professor of medicine, University of Rochester School of Medicine; Diet in Renal Diseases, Dr. Estelle Hawley, University of Rochester School of Medicine; Diet in Relation to Surgery, Dr. Samuel Standard, assistant clinical professor of surgery, New York University College of Medicine, New York; Diet in Relation to Surgery, Gertrude Miller, chief dietitian, Buffalo General Hospital, Buffalo, N. Y.; The Energy Factor in Nutrition, Dr. John R. Murlin, professor of vital economics, University of Rochester School of Medicine; Low Cost Foods to Fit Special Diets, Sue Sadow, director of home economics, Department of Welfare, New York.

BOOK REVIEWS

The Vitamins. A Symposium Arranged Under the Auspices of the Council on Pharmacy and Chemistry and the Council on Foods of the American Medical Association. Chicago: American Medical Association, 1939, pp. 637. Price $1.50.

The several contributions assembled in the book under review are based on those which appeared earlier in the *Journal* of the American Medical Association and represent the views of several leading authorities who have summarized the available knowledge relative to certain phases of vitamin study.

The contents cover the chemistry, physiology, pathology, pharmacology and therapeutics of vitamin A, the methods of assay and sources of this vitamin in food, and the requirements; the components of the vitamin B complex; the chemistry, physiology, therapeutic use of, methods of assay and food sources and human requirements for vitamin B_1 (thiamin); the chemical, physiologic and pathologic aspects of riboflavin and its dietary sources and requirements; and the chemical, physiologic, and pathologic aspects of vitamins C and D, the methods of assay, sources and human requirements for these vitamins. Other chapters are concerned with the pathology of beriberi, the prevention and treatment of pellagra, ultraviolet therapy, vitamin E, and other less well known vitamin factors.

Included under Dr. Fishbein's introduction are the allowable claims concerning the various vitamins and chemically identified vitamin substances as authorized by the Council on Pharmacy and Chemistry. This and the chapters following should be invaluable as a source of reference for the dietitian and nutritionist.

Nutrition and Physical Degeneration. By Weston A. Price, D.D.S. New York: Paul B. Hoeber, Inc. 1939, pp. 431. Price $5.00.

Dr. Price has long been recognized as having made distinct contributions to our knowledge of the etiology of dental caries through his own pioneer studies and his success in stimulating widespread public and professional interest in this problem. Since 1931, with his wife as assistant, he has traveled to remote parts of the world seeking peoples isolated from civilization. Dr. Price sought information on their dental development, general health, and on the incidence of caries as well as on their food habits and conditions of living. He compared his findings with those for nearby tribes of people in each locality who had adopted many of civilized man's food and living habits.

This published record of his observations contains over a hundred excellent photographs of the teeth and dental arches of these persons, young and old. The book is also a storehouse of reliable qualitative information concerning the way these distant peoples eat and live. Students of nutrition will prize the book for these reasons. There are many thoughtful students, however, who will take exception to Dr. Price's interpretation of many of his valuable data.

Dr. Price concludes that the determining characteristic of all successful diets is richness in fat-soluble vitamins, either from dairy products, organs of animals and eggs of birds, sea foods, small animals or insects. He also claims great superiority in minerals for such diets but fails to include references to analytical data and methods used in evaluating the mineral and vitamin content of the native foods which he collected on his travels. His method of expressing values he found for diets used by primitive peoples is unique but confusing and cannot be compared with findings of familiar published dietary studies. Dr. Price shows that those primitive peoples who are in contact with civilization invariably substitute white flour, sugar, jams, marmalades, and canned foods for many articles of their native diet, thereby definitely lowering its nutritive value.

The author is unquestionably justified in regarding many of the imperfections of primitive man in contact with civilization, as shown in poor physical development and body structure, including poor dental arches and tooth enamel, as due to substitutions of these sophisticated foods for native foods. Is he justified, however, in declaring that these imperfections are due to defects in maternal or paternal germ cells? Cannot young infants today, previously poorly nourished, develop splendid bodies when properly fed and cared for?

The author is convinced that dental caries is caused by "local solution of the tooth substance

by acids produced by bacteria." Yet he states that adequate dietary supply of "fat-soluble activators" will ensure a blood and saliva with ample defense factors against the growth of these bacteria. He also claims that saliva of suitable composition will cause teeth to harden from the surface inward, much as wood petrifies. Yet he fails to include any data on the composition of blood and saliva in defense of his thesis, even though he tells, in several instances, of collecting saliva samples for analysis.

Dr. Price says that one-half teaspoon, three times a day, of an equal volume of butter oil (the portion that is liquid at 70 degrees F.) and very high vitamin cod liver oil, is sufficient to control widespread tooth decay when used with a diet that is *low in sugar and starches*, and high in foods providing the minerals, particularly phosphorus. There is ample scientifically controlled evidence today that diets *low in sugar* have a specific ability to eliminate the bacteria that produce the acid which causes decay in most persons' teeth and that diets *high in sugar*, even though containing all recognized dietary factors in liberal amounts, encourage their growth in the mouth. Would not Dr. Price's evidence that the diet of primitive man, wherever he lives, is practically devoid of sweets, explain his freedom from tooth decay? His data show also that sweets are always used liberally by those with a high incidence of caries.

The medical profession will doubtless criticize Dr. Price, who is a dentist, for prescribing for desperately ill children and for persons very ill with arthritis and other serious ailments (Chapter 15) as well as for many of the statements regarding the relation of preconception maternal and paternal nutrition to the mental and moral as well as physical degeneration of offspring. The book would have been a far stronger proof of the close relation between eating and living habits and health without the last five or six chapters. The data are far more convincing than are the author's interpretations. MARTHA KOEHNE, PH.D., *Nutritionist, Ohio Department of Health.*

You Can't Eat That! By Helen Morgan. With a foreword by Dr. Walter C. Alvarez of the Mayo Clinic. New York: Harcourt, Brace and Company, 1939, pp. 330. Price $2.50.

There is no clue as to the qualifications of the author, other than the statement that she "learned by experience"; but at any rate she acknowledges the help, in working out the recipes, of Caroline Ruttle, who it seems doubles dexterously in cooking while earning distinction as a Chinese dancer on the stage. All of this adds the refreshing, ruminative note so lacking in most books of this type. In any event, Miss Morgan has achieved a sprightly, entertaining and instructive book, well bolstered by factual statements clothed in phrases that will be grasped by the layman. Today's readers, educated in or inured to hyperbole, will understand what is meant by the statement, "you may swell up like a balloon after eating a sprig of parsley", culled from the preliminary chapters which are keyed to the de Kruif school of scientific writing. But the author succeeds in packing in a lot of sound information in a few introductory pages of pungent paragraphs.

These are followed by nearly two hundred pages of helpful recipes and much painstaking information on the content of packaged or commercially prepared foods. Another chapter tells of the "jokers" in cooked foods, some of which were decidedly that to this reviewer, for we never heard of baked beans that contained peas and wheat flour (p. 300). For those who seek "to circumvent the doldrums of restricted diet", the book should prove readable and decidedly helpful.

Chef's Cook Book of Profitable Recipes. By L. P. De Gouy. Stamford, Conn., The Dahls, 1939, pp. 246. Price $3.00.

This is a very helpful book and the fact that the author is said to have been trained under the great Escoffier need not lead one to conclude that the recipes presented are beyond the ken of the common garden variety of chef. On the whole the recipes are nicely arranged and would offer no obstacles to the average cook.

Especially commendable are the chapters on garnishings, many of the salad suggestions and combinations, the salad dressings, the hot sandwiches, three-deckers and sandwich fillings.

Among the impressive list of accomplishments of the author, he is said to be a "graduate food chemist and dietitian". This perhaps accounts for the interesting explanation, in the introduction, of how our ancestors were able to eat what they pleased and "get away with it"—"They worked harder out of doors and burned up the excess poison produced by wrong combinations of foods."

CURRENT LITERATURE

American Journal of Digestive Diseases

Vol. 6, October 1939

The characteristics of the normal human gastric secretory curve using an improved gastric test meal. C. M. Wilhelmj and A. Sachs.—p. 529.

*The absorption and dilution of glucose solutions in the human stomach and duodenum. H. Shay, J. Gershon-Cohen, S. S. Fels and F. L. Munro.—p. 535.

GLUCOSE SOLUTIONS IN HUMAN STOMACH. Considerable amounts of glucose may be absorbed by the stomach alone from solutions of high concentration. From concentrations below 15% no appreciable absorption could be demonstrated. The importance of the stomach in man as a diluting organ is insignificant in comparison with the duodenum.

American Journal of Diseases of Children

Vol. 58, October 1939

*Effect of irradiated milks on storage of nitrogen and acid-base minerals in children. F. C. Hummel, H. A. Hunscher, I. G. Macy, M. Bates, P. Bonner, J. Horton, M. Shepherd, H. Souders, L. Emerson and A. T. Johnston.—p. 753.

*Iron deficiency anemia in children. O. D. Abbott and C. F. Ahmann.—p. 811.

STORAGE OF MINERALS. While the additional vitamin D in irradiated milk had no nutritive advantage in the deposition of minerals, children showed a more rapid growth in length during periods when vitamin D was the only factor added. Increase in skeletal growth was accompanied by a higher calcium-phosphorus ratio in retention, indicating a stimulus to formation of bone and, by the decrease in retention of nitrogen, phosphorus and sulfur, a shift from the formation of soft tissue to that of skeletal structure. It is concluded that vitamin D supplements in the form of irradiated milk included in a dietary known to be nutritionally adequate and given to children who have good health and good nutritive histories not only exert a regulating influence on the growth impulses but stimulate skeletal development.

IRON DEFICIENCY ANEMIA. A study of hemoglobin values of 883 rural school children in Florida showed 50% to be anemic and 31% borderline. Administration of iron and ammonium citrates to 200 of these children over 42 days resulted in a rapid regeneration of hemoglobin. A diet high in iron-carrying foods produced an increase in hemoglobin in 47 nursery school children; but in cases of severe anemia, even after 90 days of the diet, hemoglobin values remained subnormal.

American Journal of Public Health

Vol. 29, October 1939

*Bacteriological tests on mechanical dishwashers for home use. W. E. Ward and G. M. Dack.—p. 1114.

*Zoological problems relative to meat inspection and their bearing on public health. B. Schwartz.—p. 1133.

Tuberculous infection due to milk. Editorial.—p. 1154.

A new name for dry milk solids. Editorial.—p. 1155.

*Advance in food handling. Editorial.—p. 1156.

MECHANICAL DISHWASHING. Two mechanical dishwashers designed for domestic use were subjected to rigidly controlled tests for the removal of bacteria from dishes contaminated with food soils consisting of egg, Crisco, or farina. The food soils were inoculated with bacteria. Dishes washed in the 2 machines were not sterile but had fewer residual bacteria than those washed by hand. The numbers of residual bacteria are apparently reduced by a mechanical washing-away action and not by the temperature of the water or any great germicidal effect of the detergents.

MEAT INSPECTION. An effective system of meat inspection promotes public health through condemnation of carcasses or parts containing parasites transmissible to man, through processing for the destruction of trichinae and condemnation of meats in which parasitic infestations not transmissible to man, but objectionable from esthetic and other standpoints, are so generalized that the parasites and lesions cannot be removed by trimming. Meat inspection is an effective control for certain parasites.

FOOD HANDLING. The increasing use of stainless steel in all the various types of food handling, preservation, preparation, and serving, especially in public places, marks a distinct advance from the public health point of view.

Annals of Internal Medicine

Vol. 13, October 1939

*Neoprontosil (oral) in the treatment of chronic ulcerative colitis. A. E. Brown, W. E. Herrell and J. A. Barger. —p. 700.

Case report: Beri-beri; Severe manifestations of both "wet" and "dry" forms in the same patient, recovery following treatment. B. D. Epstein and A. Gerber. —p. 728.

CHRONIC ULCERATIVE COLITIS. Encouraging clinical responses and lack of toxic manifestations associated with the use of neoprontosil (oral) in a study of 48 patients with chronic ulcerative colitis justify the use of this substance. In one group of patients treated solely with neoprontosil (oral), 44.8% obtained excellent results, 44.8% obtained fair results, and only 10% were considered failures. This does not indicate that neoprontosil is a specific for chronic ulcerative colitis.

Archives of Internal Medicine

Vol. 64, October 1939

*Experimental renal insufficiency produced by partial nephrectomy. XIII. A summary of the effect of whole liver, whole meat, extracted liver and extracted meat diets on renal hypertrophy, renal function, blood pressure and cardiac hypertrophy. A. Chanutin and S. Ludewig.—p. 747.

*Experimental renal insufficiency produced by partial nephrectomy. XIV. Diets containing whole dried yeast. A. Chanutin and S. Ludewig.—p. 756.

*Juvenile diabetes mellitus. W. H. Grishaw, H. F. West and B. Smith.—p. 787.

A review of the literature from July 1938 to July 1939. C. M. Jones.—p. 834.

RENAL INSUFFICIENCY. A summary is given of the effect of whole liver, whole meat, extracted liver and extracted meat diets on renal hypertrophy, renal function, blood pressure and cardiac hypertrophy. The concentration of protein in the diet of the rat has a greater effect on the function of the normal and abnormal kidney than the type of protein component.

WHOLE DRIED YEAST. Experiments indicated that yeast contains substances capable of preventing hypertrophy within definite levels of protein intake. Yeast does not prevent hypertrophy of the kidney remnant.

JUVENILE DIABETES MELLITUS. Improvement noted among children with diabetes during the past decade can be attributed almost entirely to more nearly normal nutrition rather than to any particular dietary scheme.

Archives of Pediatrics

Vol. 56, October 1939

*Juvenile diabetes treated with protamine-hexamine insulin—a new combination. B. Alpert.—p. 647.

JUVENILE DIABETES MELLITUS. Hexamine insulin and protamine-zinc insulin, when mixed in the same vial, retain their individual characteristics. The hexamine insulin gives an immediate and some intermediate blood sugar lowering effect, while the delayed action of the protamine-zinc insulin is preserved. The use of the combined insulins in equal amounts eliminates the necessity for supplementary injections during the day.

British Medical Journal

Number 4110, October 14, 1939

*The antirachitic value of human milk. J. C. Drummond, C. H. Gray and N. E. G. Richardson.—p. 757.

*The pathology of chloride metabolism in man. A. Lyall. —p. 760.

*Diabetes and kidney failure. K. E. Barlow.—p. 765.

ANTIRACHITIC VALUE OF HUMAN MILK. Calcium, phosphorus, and vitamin D determinations were made on 26 random samples of breast milk collected during the first two months of pregnancy from working class women patients in London. There was no evidence of seasonal variation; the mean value was 6 I.U. of vitamin D per 100 ml. The vitamin D content of human milk is increased by raising the vitamin D content of the diet. Large doses of vitamin D failed to bring about a proportional increase in the vitamin D content of breast milk; 10 I.U. per 100 ml. of breast milk represents about normal maximum value and may be maintained by an estimated minimum daily intake of 200 I.U.

CHLORIDE METABOLISM IN MAN. The average normal adult on an ordinary diet ingests about 12 gm. of sodium chloride daily, a large proportion of which is excreted. The basal requirement is about 2 gm. daily when there is no unusual loss through perspiration or any pathological condition causing a loss of salt.

DIABETES AND KIDNEY FAILURE. Observation of 2 diabetic patients with kidney damage showed that the renal threshold for glucose is lowered; thus the degree of glycosuria may be high without the blood sugar being raised to a degree likely to be toxic to cell function. In such cases insulin should not be administered under guidance of urinary glucose.

Hygeia

Vol. 17, October 1939

*Dangerous water. G. A. Abbott.—p. 899.
*Special purpose canned foods.—p. 921.

DANGEROUS WATER. Fluorides play havoc on tooth enamel. Disfiguring brown or black stains develop, followed by severe pitting and corrosion. Fluorides also seem to reduce the calcium content of the blood, with a resulting disturbance of body metabolism. High blood pressure and development of certain forms of nervous disorders have also been reported.

UNSWEETENED FOODS. In the usual processing of fruits, sugar amounting to 20 to 50% of the contents of the container may be added. Therefore, fruits and vegetables, juice or water packed without added sugar or salt, are of value in reducing diets. Canned fruits and vegetables which meet standards in every respect, except that they are packed in water, must be so labeled. Brands of such foods are listed.

Journal of Biological Chemistry

Vol. 130, October 1939

*Preparation of vitamin B_6 from natural sources. R. D. Greene.—p. 513.
*Glycogen in the seed of Zea mays (variety Golden Bantam). D. L. Morris and C. T. Morris.—p. 535.
*Pyruvate in working muscles of normal and vitamin B_1-deficient rats. J. L. Bollman and E. V. Flock.—p. 565.
*Studies in mineral metabolism with the aid of artificial radioactive isotopes. III. The influence of vitamin D on the phosphorus metabolism of rachitic rats. W. E. Cohn and D. M. Greenberg.—p. 625.
*Studies in protein metabolism. X. The metabolic activity of body proteins investigated with l(−)-leucine containing two isotopes. R. Schoenheimer, S. Ratner and D. Rittenberg.—p. 703.

VITAMIN B_6 FROM NATURAL SOURCES. A method for the preparation of crystalline vitamin B_6 from rice bran is described. Yields of 10 to 15% were obtained.

GLYCOGEN IN CORN. A carbohydrate that is apparently identical with glycogen has been prepared from the seed of Zea mays, Golden Bantam variety. Its properties have been compared with those of glycogen and dextrin from other sources.

PYRUVATE IN WORKING MUSCLES. Rat muscle contracting at the rate of 3 times each second rapidly increases its content of pyruvic acid, so that 4 or 5 times the amount found in resting muscle is present within 30 to 60 seconds. The ratio of the increased pyruvic acid to the increased lactic acid is about 1:40. Excess pyruvic acid is rapidly removed from the muscle, so that resting values are again present after 2 to 5 minutes.

VITAMIN D AND PHOSPHORUS METABOLISM. The absorption of phosphate by rachitic rats is increased but little by vitamin D. The decrease in fecal phosphorus in these rats caused by vitamin D is due to both increased absorption from and decreased re-excretion into the gut. Vitamin D raises the inorganic phosphorus uptake in the bone 25 to 50%. From indirect evidence it appears that vitamin D may act to aid the conversion of organic to inorganic phosphorus in the bone. The increase of bone phosphorus caused by vitamin D appears to be principally at the expense of the most recently ingested phosphorus.

ACTIVITY OF BODY PROTEINS. Continuous chemical processes occur extensively in tissue proteins, even under conditions of nitrogen balance. The dietary nitrogen enters the pool of these spontaneous reactions which tend ultimately to replace protein nitrogen. The urinary nitrogen represents a sample of the metabolic mixture originating from the chemical interaction of dietary nitrogen with relatively large amounts of reactive tissue nitrogen.

Journal of Clinical Investigation

Vol. 18, November 1939

*The vitamin C requirement of man. Estimated after prolonged studies of the plasma concentration and daily excretion of vitamin C in 3 adults on controlled diets. E. P. Ralli, G. J. Freedman and S. Sherry.—p. 705.
*Calcium exchange of the intestine in experimental hyperthyroidism. T. L. Althauser, W. J. Ken and M. Stockholm.—p. 763.

*Changes in the glucose tolerance of obese subjects after weight reduction. R. S. Hubbard and E. C. Beck. —p. 783.

VITAMIN C REQUIREMENT OF MAN. Saturation of the body tissues with vitamin C does not occur until the plasma concentration is at a level of 1.0 mg. %. As this level can only be obtained and maintained on a daily intake of at least 100 mg. of vitamin C, it is suggested that this be considered the optimum daily intake.

CALCIUM EXCHANGE IN HYPERTHYROIDISM. Hyperperistalsis and overeating are the chief causes of increased fecal output of calcium in hyperthyroid rats maintained on a calcium-free diet. There is no appreciable change in calcium absorption.

CHANGES IN GLUCOSE TOLERANCE AFTER WEIGHT REDUCTION. Most patients with obesity show an abnormality in tolerance for glucose which can usually be improved by weight reduction through diet therapy. Improvement appeared to be due to the weight reduction rather than directly to the diet for the change in the curve, persisting when the amount of carbohydrate fed was increased, was of a type which could not readily be explained by the ingestion of diets low in food value, and paralleled roughly the changes in weight.

Journal of Nutrition

Vol. 18, October 1939

Effect of several calcium salts on the utilization of lactose. H. S. Mitchell, G. M. Cook and K. L. O'Brien.—p. 319.

*Fatty livers as a result of thiamin administration in vitamin B_1 deficiency of the rat and the chick. R. W. Engel and P. H. Phillips.—p. 329.

*Factors influencing storage of protein with low-calorie diets. M. E. Lovell and I. M. Rabinowitch.—p. 339.

*A new low fluorine diet and its effect upon the rat. R. J. Evans and P. H. Phillips.—p. 353.

*The relation of vitamin C deficiency to nutritional anemia. H. C. S. Aron.—p. 375.

*The effects produced by an increase in the calcium and phosphorus content of the diet on the calcium and phosphorus balance and on various bodily constituents of the rat. J. Haldi, G. Bachmann, W. Wynn and C. Ensor.—p. 399.

*The effect of heat and solvents on the nutritive value of soybean protein. L. M. Johnson, H. T. Parsons and H. Steenbock.—p. 423.

THIAMIN AND FATTY LIVERS. Thiamin therapy in experimental vitamin B_1 deficiency in rats and chicks causes an excessive production of free fat in the liver cell which disrupts the normal cell structure but does not seriously disturb its function. Dessicated thyroid prevents the histologic reactions in the liver.

PROTEIN STORAGE ON LOW CALORIE DIETS. A study made of the nitrogen metabolism of diabetics treated with low calorie diets but with different amounts of carbohydrate and fat and different amounts of vegetable and animal proteins confirms previous observations that carbohydrates tend to enhance, whereas fats tend to interfere with storage of protein in the body. Between-meal feedings of carbohydrate resulted in still greater retention of nitrogen. In three diabetic children showing nutritional dwarfism, a high protein intake of which a high proportion was animal protein, a liberal amount of carbohydrate, a small amount of fat, and between-meal feedings of carbohydrate resulted in a marked increase in protein storage and skeletal growth.

LOW FLUORINE DIET. Mineralized milk proved to be a good low-fluorine diet through 5 generations of rats. The low level of fluorine furnished by the basal milk diet did not deplete the fluorine stores of the rat nor did it increase the demand for fluorine. No cumulative effect was carried over from generation to generation on the basal diet or on the basal diet supplemented with increasing amounts of sodium fluoride. On the basal ration plus 20 p.p.m. of fluorine the incisor teeth were definitely bleached and elongated.

VITAMIN C AND ANEMIA. When guinea-pigs are fed a scorbutogenic diet with an addition of ascorbic acid for 50 days or more, a period longer than the life cycle of the erythrocyte, normal blood formation takes place. Guinea-pigs made anemic by the withdrawal of ascorbic acid from their diet can be cured by administration of ascorbic acid in large amounts either orally or subcutaneously. The rise in hemoglobin induced by ascorbic acid medication takes place much faster than the rise in body weight. This indicates that the anemia is cured long before the repair of other body tissues is accomplished.

HIGH CALCIUM AND PHOSPHORUS INTAKE. When large amounts of calcium and phosphorus

were added to the rations of albino rats, practically all excess calcium was recovered in the feces. Phosphorus in feces was considerably less than the excess intake. The kidneys had to excrete very little more calcium but much more phosphorus than on the control ration. The percentage gain in body weight was not affected by high calcium-phosphorus intake. The dry weight of the body was lower, indicating increased water content. The fat content of the body was significantly reduced by the increased intake of calcium and phosphorus. The large amount of calcium and phosphorus interfered to a slight extent with the absorption of food material as shown by combustion of feces.

SOY BEAN PROTEIN. Sulfur and nitrogen balances on rats confirm previous findings that the nutritive value of soy bean protein is improved by heat. Soy beans contain a sulfur and nitrogen-containing complex which is absorbable but available for tissue building purposes only after being heated.

Journal of the American Dental Association

Vol. 26, October 1939

*Vitamin A and B deficiency—an etiologic factor in acute, subacute and chronic Vincent's infection and other dental conditions. J. A. Sinclair.—p. 1611.

*Advanced age in relation to dental caries in white rats. C. A. H. Smith, R. F. Light and C. M. McCay.—p. 1700.

VITAMIN A AND B DEFICIENCY IN VINCENT'S INFECTION. The number of subclinical avitaminosis cases may be very large and may have a direct relationship to pyorrhea and acute, subacute, chronic and recurring Vincent's infection. Lack of vitamin B_1 or of vitamin A may be involved in the extreme sensitiveness of the roots of the teeth to instrumentation and abnormal thermal response, as these conditions often cease with vitamin therapy. Large doses of the deficient vitamins are required to re-establish the normal vitamin content of the body.

ADVANCED AGE IN RELATION TO DENTAL CARIES. The teeth of rats, whose total life span had been greatly extended, were studied to determine the effect of aging and also the effect of synthetic diets composed of fine particles, fed throughout life. The span of life was extended by retarding growth for 300 to 1000 days. The normal rat lives only about 600 days. In most groups, females proved more susceptible to tooth damage than males. Even at advanced ages a number of cases of well-preserved teeth were discovered. Caries will occur in white rats on finely divided foods. In normal animals, the incidence of injury to the teeth was slightly higher for those fed cod liver oil as a source of fat-soluble vitamins than for those given carotene and irradiated yeast.

Journal of the American Medical Association

Vol. 113, October 7, 1939

*Magnesium in nutrition. Editorial.—p. 1418.

Vol. 113, October 14, 1939

*Factors in recurrence of renal calculi. C. C. Higgins.—p. 1460.

*Calcium and phosphorus excretion in the urine of patients with renal or ureteral calculi. R. H. Flocks.—p. 1466.

*Pellagra in infancy and childhood. T. D. Spies, A. A. Walker and A. W. Woods.—p. 1481.

Vol. 113, October 21, 1939

The one hour-two dose dextrose tolerance test. M. W. Matthews, T. B. Magath and J. Berkson.—p. 1531.

*Potassium in muscle. Editorial.—p. 1571.

MAGNESIUM IN NUTRITION. The extent to which a deficiency of magnesium may occur in the human dietary is not definitely known. One effect of magnesium deficiency is a disturbance of normal calcium metabolism. Rats receiving an inadequate amount of magnesium in the diet show an increase in the percentage of calcium in the heart, kidney and muscles. The daily magnesium requirement of children from 4 to 7 years of age has been estimated to be not less than 13 mg. per kilogram of body weight. During pregnancy 350 to 450 mg. is necessary. The daily magnesium requirement for the maintenance of adults has been reported to be as low as 0.2 gm. and as high as 0.6 gm.

RECURRENCE OF CALCULI. Many factors may be associated with the formation of renal calculi. In addition to eradication of the various etiologic agents, control of the p_H of the urine by the high vitamin A acid-ash or alkaline-ash diet, depending on the chemical constituents of the stone removed at the time of operation, has been attended by a pronounced decrease in the incidence of recurrent formation of calculus.

RENAL CALCULI. A study was made of the urinary excretion of calcium and phosphorus under fixed conditions in a group of 35 patients with renal calculi. High urinary calcium was found in 23 cases. All the patients with a rapidly growing calculi or new stone formation were in the group presenting the high urinary excretion of calcium. The patients with high urinary calcium responded to an acid-ash diet and to a moderate vitamin D intake with excessively increased urinary excretion of calcium.

PELLAGRA. In an area in which pellagra is endemic, the disease is common among infants and children. Nutritional histories often reveal that the mothers of these children subsisted on inadequate diets during pregnancy and lactation, thus establishing a definite relationship between the diet of the mother and the nutritional state of the infant. Lesions characteristic of the disease are seldom seen in infancy but frequently appear early in childhood.

POTASSIUM IN MUSCLE. Rats deprived of potassium show a decrease of almost 50% in the potassium of muscle and a concomitant rise in the level of sodium. In some cases the muscles become richer in sodium than in potassium. In the muscles of the deficient animals most of the sodium is confined to the intracellular phase. Part of the potassium liberated by muscular activity is taken up by the liver; in recovery the reverse change occurs, since it has been shown that the muscle regains the potassium which it has lost.

Ohio State Medical Journal

Vol. 35, October 1939

*Treatment of nephritis. H. O. Mosenthal.—p. 1049.

TREATMENT OF NEPHRITIS. Curtailment of protein in Bright's disease has a double disadvantage. It produces malnutrition, anemia, invalidism, increased susceptibility to infections and causes degeneration of tissues throughout the body, including the kidneys. The daily ration should contain 70 to 80 gm. of protein plus the amount represented by the loss of albumin in the urine. Greater amounts of protein are frequently advocated but are exceedingly difficult for the patient to consume. The treatment of Bright's disease is no longer aimed at sparing only the kidney but considers the general condition of the patient.

Public Health Nursing

Vol. 31, October 1939

*Helping families on small food budgets. A. D. Bowes. —p. 532.

SMALL FOOD BUDGETS. Recent studies show that a large percentage of American diets are deficient in minerals and vitamins, with relatively greater deficiencies occurring among low income families. A market guide suggested for a family of nine is tabulated along with a clinic patient's food purchases. An increase in health protection was secured largely by more milk, oatmeal, potatoes, leafy vegetables, dried beans, eggs and butter. Recent dietary studies carried on in Philadelphia indicate that most individuals even on low income tend to secure adequate calories and protein. The greatest deficiencies tend to occur in minerals and vitamins.

Scientific Monthly

Vol. 49, October 1939

*The influence of nutrition on the diseases of middle and old age. V. G. Heiser.—p. 304.

INFLUENCE OF NUTRITION. Examples of several valuable contributions to the field of nutritional research are given. Evidence shows the close association between diet and the preservation of healthy cells and tissues with consequent normal function. Correct eating involves a much lower outlay for food than is customary. If a diet is correctly balanced a smaller quantity of food will suffice. A nation that can regulate its food consumption in accordance with scientific principles may not only produce a larger percentage of sound healthy people, but at a cost infinitely less, and by inference become the leader of the world.

INSTITUTION MANAGEMENT

Consumers' Guide

Vol. 6, October 1939

*Dayton works out wrinkles in the food stamp plan.—p. 3.
*Watch for apples.—p. 9.
*Modernizing weights and measures laws.—p. 12.
*We'll have enough food next year.—p. 13.
*Dividends for junior consumers.—p. 6.
Draw your own food charts.—p. 13.

DAYTON STAMP PLAN. For 3 months, Dayton, Ohio, has been using a unique stamp plan for relief families. The city buys orange stamps from the government, and gets blue stamps free. It sells orange stamps to low income families and gives blue stamps to relief families. Only foods and household supplies may be purchased for orange stamps, and only surplus foods for blue stamps. The stamps are redeemable in cash for full value at banks. The plan, in addition to raising health standards, is increasing sales of surplus foods, grocery incomes, and prosperity of farmers.

WATCH FOR APPLES. Good bargains are expected in apples because of large production (over 102 million bushels). A chart illustrates the use of 37 different varieties of apples and season of maximum abundance. The size of containers is standardized only in the Northeast but most containers state the number of apples.

WEIGHTS AND MEASURES. In order that New York consumers may get full value for each penny spent, the state has standardized the size of containers and the weight of a volume of ice cream, containers for malt beverages, paper and other containers for milk, amounts of thread on spools, and the methods of sale of vegetables, fruits, grains, and nuts. It has provided a means of protecting consumers against short weights and measures.

FOOD SUPPLY. According to estimates of the Bureau of Agricultural Economics, the food supply for the year 1939–40 will be plentiful. A table comparing native per capita consumption of the various foods for 1925–29 and for each year from 1936 to 1940 and the export and native per capita estimates for 1939–40 indicates a sufficient supply of all foods. Prospects for supplies of individual foods—fats, cereals, vegetables and fruits are discussed.

DIVIDENDS FOR JUNIOR CONSUMERS. The goal of the Federal Surplus Commodities Corporation is to feed 5,000,000 undernourished school children at least one full meal a day. It will need the aid of various federal, state and local associations. Surplus food will be used. The result will be tested by the health condition of the children 10 years from now. A well operating program in the District of Columbia is completely described. Full details will be furnished anyone interested in starting a plan in their community.

The Journal of Home Economics

Vol. 31, November 1939

*The sanitation of eating utensils. H. T. Smith.—p. 610.
*A guidance-research program in home economics education. R. T. Lehman, D. D. Scott and W. L. Morgan.—p. 615.
*W.P.A. school lunch program. F. Kerr.—p. 624.
*Reorganization in the federal government. Editorial.—p. 632.
*Recent advances in nutrition. J. I. Rowntree.—p. 635.

SANITATION. The task of educating the public to demand correct sanitation of dishes, glasses and silver is described, including some of the problems presented and what has been done to solve them. Describes instances of good sanitation.

GUIDANCE RESEARCH PROGRAM. Details of the organization of the 2-year-old Guidance Research Program for selection and guidance of home economics undergraduates at Ohio State University are explained, and plans for the remainder of the 5-year period are listed.

WPA LUNCH PROGRAM. A description of the work accomplished by WPA lunch programs in 44 states, District of Columbia and New York City, in which employment for needy women, and healthy, brighter children were gratifying results.

FEDERAL REORGANIZATION. Lists new departments of federal agencies which have subdivisions dealing with home economics.

NUTRITION ADVANCES. Suggested solutions of the food surplus question, measures of state of malnutrition, evidences of collective rather than individual functions of food within the body, relationship of food preparation and nutritive value, between psychic and physical state, and of teaching methods to health, are further discussed.

Hospital Management

Vol. 48, October 1939

*The use of frozen foods in the hospital. N. Morris. —p. 47.

FROZEN FOODS. The quick freezing of high quality foods makes it possible for hospitals to have year-round variety in menus without prohibitive costs. Gives different methods of contact freezing and spray freezing. Vitamins are preserved in frosted foods, but in preparation they may be destroyed, especially vitamin C.

The Horwath Hotel Accountant

Vol. 19, November 1939

Food and beverage costs.—p. 3.
*Budgeting expenses. G. O. Podd.—p. 4.
*Club restaurant ratios.—p. 7.

BUDGETING EXPENSES. An address delivered at the annual convention of the National Restaurant Association, Chicago, October 6, includes preliminary planning, food and beverage rations, variability of payrolls, and errors to avoid in budgeting expenses.

CLUB RESTAURANT RATIOS. In percentage form, a statement shows the results attained in a restaurant department of a large city club for the first half of 1939 in comparison with the same period of 1938.

The Hotel Monthly

Vol. 47, October 1939

Diesel power cuts air-conditioning costs. A. F. Landstreet.—p. 15.
Increasing the seating capacity.—p. 17.
*Fifty ways to reduce expenses without curtailing service. —p. 36.
*100 years of menu-making.—p. 43.
*The housekeeper's primer. J. C. Van Ness.—p. 45.
*The coffee shop.—p. 47.
*Turkey chicken comparison chart.—p. 50.

REDUCING EXPENSE. Includes 50 practical suggestions for reducing expenses without decreasing the amount and number of services, and recommendations for the economical operation of architectural, plumbing and electrical features; heating systems; maintenance supplies; help turnover and unemployment compensation; and menu-making and food control.

MENUS. This installment from the Arnold Shircliffe collection illustrates the elaborateness and extensiveness of menus in leading hotels during 1843 to 1850.

HOUSEKEEPING. Especially written for the housekeeper in the small hotel is Jane C. Van Ness' primer with recommendations for selecting employees; directions for maids and detailed instructions for servicing a room are included.

COFFEE SHOP. Ernie Boles, chef, Palmer House Coffee Shop, gives recommendations for keeping trade and maintaining profits in the face of rising prices. The lower priced entrée should not be moved into the higher priced class but the price of it may be raised using "an additional garniture" or "a better accompaniment." He suggests saleable dishes using scraps and trimmings and low cost ingredients.

FOWL YIELD DATA. Charts comparing the meat yields of turkey and chicken convincingly illustrate the economy of turkey over chicken at the market prices of $.21 and $.22½ per pound respectively.

Modern Hospital

Vol. 53, November 1939

*Cooking electrically. T. R. Burgess.—p. 92.

COOKING ELECTRICALLY. Watts Hospital, Durham, North Carolina, in 1936 replaced gas equipment with heavy duty electric equipment. Better prepared food, ease of control, economy, use of stored heat, cooler and cleaner kitchens, and no fire or explosion hazards are some of the results. The only disadvantage, slowness of heating, has been overcome by turning on ranges and making connections far enough in advance to ensure proper heating. The dietetic staff regulates this heating during the day. The night watchman on his last round turns on the ranges

and makes the various connections that are necessary for heating the ward food conveyors for the morning.

The Nation's Schools

Vol. 24, November 1939

*Portfolio of cafeterias.—p. 33.
*Cafeteria as a teaching medium. W. G. Smillie.—p. 34.
*Utah serves lunch. M. Bowers.—p. 35.
*Food control is needed. W. T. Roenigk.—p. 37.
*High school lunchroom building. F. L. Moffett and H. D. Payne.—p. 39.
*Laying out the lunchroom. R. Spearman.—p. 41.
*Cafeteria is social center. M. May.—p. 43.
*Vocational training. F. M. Richardson.—p. 44.
*Clean dishes and clean pans. M. de G. Bryan.—p. 45.
*Fish in the school diet. C. C. Hart.—p. 47.
*Standards of school sanitation. W. W. Bauer.—p. 62.

LAYOUTS. A group of photographs of the kitchen of the Clifford J. Scott High School, East Orange, New Jersey, and of the cafeteria counter and cafeteria proper at the Toppenish Junior-Senior High School, Washington, pictures two new school cafeteria layouts.

CAFETERIA AND TEACHING. Dr. Wilson G. Smillie analyzes the health educational possibilities of school cafeterias and says that by combining the efforts of a trained manager, health education department, and art classes, best progress can be made.

SCHOOL LUNCH IN UTAH. Federal, state and local organizations pooled their efforts and money for Utah's school lunch program. Utilizing local garden plots, W.P.A. funds and labor, the P.T.A. organizations have acted as coordinators and managers in growing and canning vegetables for use in schools. The interest aroused has resulted in better home-planned lunch boxes, and increased enthusiasm in health classes for planning and eating better foods.

CONTROLLED FOOD COSTS. A high school teacher of commercial subjects describes in detail and illustrates a simple system of controlling food costs in the school cafeteria. The bookkeeping necessary can be done by a competent commercial student, and any added expense is balanced by savings resulting from less spoiled food, better standardized portions, and increased accuracy by cashiers.

SEPARATE LUNCHROOM BUILDING. A plan and description of a separate lunchroom building in Center, Texas, supplements the dining room for eating with its use for classroom instruction.

LUNCHROOM PLANS. Rosa Spearman, dietitian, Dallas Public Schools, Texas, points out problems encountered in planning an efficient and attractive lunchroom. She gives definite figures for work and service areas and suggests efficient routing systems and plans for placing equipment.

SOCIAL CENTER. A New Haven, Connecticut, school uses its cafeteria to enlarge pupil activities within the school by establishing its use for teas, dances and games on Saturday afternoons.

VOCATIONAL TRAINING. A successful plan for training high school students in institutional management has been adopted in the Atlantic City schools. Hotels and restaurants have cooperated in organizing training courses for foods workers. Laboratory work is divided into various sections, each one emphasizing a phase concerned in commercial food preparation and service.

CLEAN DISHES. A thorough discussion of methods, types of dishwashers, temperature of water, varieties of detergents and ways of drying dishes and pans.

FISH IN THE DIET. Constance C. Hart discusses fish as a food, its nutritive value, sources, and place in the school diet. To illustrate the varied form in which it can be served, she has planned several menus using fish as the main dish.

SCHOOL SANITATION. The obligations of the school in safeguarding the health and safety of the school child include the abandonment of the "perfect attendance record" in favor of a preventive program for spread of contagious diseases, and a follow-up of absentees by teacher or nurse. Suggests immunization for all diseases for which dependable procedures have been developed.

Personnel Journal

Vol. 18, October 1939

*New method of interview hiring. S. H. Ordway, Jr., and J. C. O'Brien.—p. 128.
Right relations increase efficiency. R. H. Shainwald.—p. 136.
Planning for fair salaries and wages. E. N. Hay.—p. 141.
*Federal policies on employee relations. J. J. Corson and I. M. Smith.—p. 151.

HIRING. Extracts from a report dealing with a series of experiments to improve the technic of the oral process as a method of measuring evidence of personal capacity to perform effectively in particular positions. Factors must be itemized so that the examiners will know what they are looking for and whether it is worth looking for. Personal fitness for different positions can be evidenced more reliably on the basis of factors of performance than on the basis of factors of personality which cannot be evidenced factually. Whether or not the evidence submitted by the applicant is reliable and relevant should be judged on the same basis as evidence in a court of law.

EMPLOYEE RELATIONS. Analysis of the written statements of policy in labor relations which have so far been drafted by federal agencies. In general the aspects of employee relations covered more or less fully are the following: the departments' attitude toward employee organization and representation; the right of the employees to discuss their problems with supervisors and other staff members; and procedures to be followed in connection with serious complaints. The very existence of these formal employee relations statements is an indication of at least partial realization of the objectives which they embody.

Restaurant Management

Vol. 45, October 1939

*Flashlight inspection report.—p. 15.

Vol. 45, November 1939

*Chart of American apples.—p. 6.
*Good food hints. L. P. De Gouy.—p. 12.
*Stouffer's succeed in failure location.—p. 16.
*Introducing 500 ways to cut food costs. J. B. O'Keefe.—p. 26.
*Sea foods a specialty.—p. 28.
*Modern pie cost chart. A. Easton.—p. 34.
*Profits from casserole cookery. P. J. Berard.—p. 38.

SANITATION. The check list used by inspectors of restaurant chains has itemized for sanitation inspection the equipment in each unit of the food service department and requires the percentage grading for efficiency of the most important persons employed: manager, head girl, cook and baker.

APPLES. A chart of American apples giving the various names, source, when marketed, size, color, whether acid or sub-acid, whether juicy, mealy or dry, whether best suited for eating, cooking or baking or other appropriate uses and methods of grading and packing.

GOOD FOOD HINTS. Soups may be classified into 3 groups: thin, clear soups; thin, light, delicate cream soups; and heavy thick soups or chowders, each of which has a definite place in the menu. Suggestions are given for more attractive and efficient service and for securing a better product.

STOUFFER'S. Light, colorful, tasty home-type food, served in a quiet artistic atmosphere by wholesome, well-uniformed young women, has enabled Stouffer's to succeed in what had previously been labeled as a failure location. Additional factors include remodeling and enlarging the restaurant to allow for frontage on 2 streets and service on 2 floors.

CUTTING FOOD COSTS. The first in a series of 12 articles explaining how to control food costs by a study of the "leaks" as the food passes from the market to the customer and how to stop these "leaks" and have a profitable operation. This article recommends buying consistently from a few reliable dealers rather than on the market, and buying on a cash basis for the small operator. Case histories are given to show how leaks occur and how they may be prevented.

SEA FOODS. Manning's Sea Food Grill, Miami, specializes in unusual and appetizing sea food dishes with a minimum of other dishes on the menu. The menu, as illustrated, is unusual in set-up, giving a brief description of each fish, how and where it is caught, and the weight of the serving.

PIE COST CHART. A detailed chart on pie costs listing all kinds of pies and giving the size of the pie as produced, the unit cost of main ingredients, the cost of the unit as produced, the number of portions per unit, the size of portion as served, and the cost per portion. Also given are costs per portion for cheese to be served with pie, ice cream to be served á la mode with pie, and whipped cream to be served with pie.

CASSEROLE COOKERY. The Roosevelt Hotel, New Orleans, features food served piping hot in earthenware or bi-metal casseroles. Most popular are sea foods and fish with chicken running a close second. Recipes are included.

"Meals at Their Best for 2 or 4 or 6" containing 68 tested recipes—illustrated with photographs and made more helpful with explanatory notes and balanced menus—demonstrates how appetizing and delicious food can be made more wholesome and, at the same time, cost less by using Irradiated Pet Milk.

Some of the recipes show how an extra amount of the much-needed "quart of milk a day" can be included in the diet. Others illustrate how less butter and fewer eggs can be used by following Pet Milk recipes and using Irradiated Pet Milk. Several of them demonstrate that Pet Milk can be most successfully used in place of cream and whipping cream.

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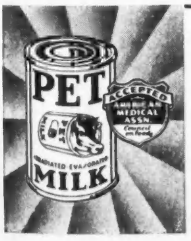

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NEWS NOTES

American Dietetic Association. The appointment of Ruth E. Forsberg, Swedish Hospital, Seattle, to fill the unexpired term of office of Reeva Hinyan on the Placement Bureau Board, was unanimously approved by the Executive Board.

The following are A.D.A. representatives on joint committees of the A.H.E.A. and A.D.A.: School Lunches, Dr. Mary deGarmo Bryan, Teachers College, Columbia University, New York, chairman; Constance C. Hart, 13 Fitzhugh St., South, Rochester, N. Y.; and Mary C. Kelly, 249 High St., Hartford, Conn. Listing of Recommended Colleges for the Selection of Student Dietitians, Dr. Alice F. Blood, Simmons College, Boston, chairman; Dr. Martha Koehne, Bureau of Child Health, Department of Health, Columbus, Ohio; Dr. Helen T. Parsons, College of Agriculture, Madison, Wis.; and Mrs. Gladys H. Silkey, Firmin Desloges Hospital, St. Louis.

Dietitians Hold Meeting at National Hotel Exposition. Dr. Mary deGarmo Bryan of Columbia University organized a special meeting on food and food service on the first day of the exposition held November 13–17 at the Grand Central Palace, New York. Nearly 300 persons, chiefly dietitians and others interested, were in attendance. Problems concerning equipment, food selection, purchasing and preparation, and menu-making in catering to large groups, were discussed by a number of experts in the field including the following: Mr. Owen Webber, equipment engineer; S. Margaret Gillam, Margaret Byrns and Helen Corbin of the Department of Nutrition, New York Hospital; Marie Casteen of the Statler Hotels System; Pearl Andrews, in charge of the dining car service of the New York, New Haven and Hartford Railroad; Ann McLaughlin, in charge of Loeser's Department Store Restaurant, Brooklyn, New York, and Miss Hunn, manager of a popular restaurant in New York.

This special session for dietitians, the first to be presented at the National Hotel Exposition, indicates that hotel officials are recognizing the place of the science of dietetics and nutrition in the hotel field.

Culinary Congress. The New York *Times* for November 8, in reporting the meeting of the Culinary Congress at the Waldorf Astoria, the first to be held in the United States, attended by leading chefs of the country, called attention to Mr. Lucius Boomer's remarks concerning the supplanting of á la carte service in hotel restaurants by the selective meal.

It was the feeling of many in the group that the average American youth does not adapt himself so readily to the training program for the future chef as does his European contemporary. Another speaker, Dr. A. C. J. Simard, pointed out the need for training in the basic sciences as a preliminary to the study of the fine art of cookery. He further added that trained dietitians and nutritionists who serve only the sick should extend their service to the well public also, indicating that such a measure "would operate in the manner of preventive medicine."

Annual Associated Grocery Manufacturers of America Award for Outstanding Work in Nutrition. At a luncheon on October 31 during the 31st annual convention at the Waldorf Astoria, New York, Dr. Mary Swartz Rose was the recipient of the annual award given "in recognition of her contributions to the science of nutrition, the great part she has played in the dissemination of scientific information concerning foods, her authorship in this field, and her outstanding career as a teacher of others who teach nutrition."

The award was made on the nomination of the advisory committee consisting of Drs. George R. Cowgill, L. A. Maynard, R. Adams Dutcher and Helen S. Mitchell. Mr. Ralph S. Stubbs, vice-president of the American Sugar Refining Company, presided, and Mr. Charles Wesley Dunn gave the introductory statement. Dr. Henry C. Sherman followed with the presentation address in which Dr. Rose was lauded for her scientific works, her practical writings on the subject of nutrition and her notable and far-reaching attainments as a teacher. Dr. Sherman then read the names of some of the prominent students of Dr. Rose who are now engaged in every modern field of activity related to nutrition throughout the United States and in foreign lands. This was the first occasion when the award had been

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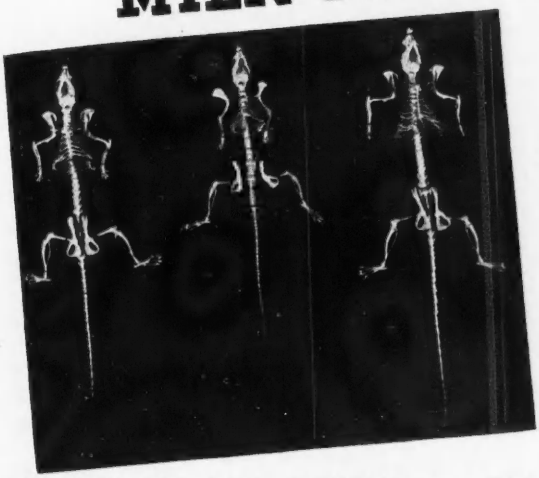

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THE AMERICAN DIETETIC ASSOCIATION

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given to a woman, previous recipients having been Drs. Lafayette Mendel, Charles A. Brown, George R. Minot, Henry C. Sherman and E. V. McCollum.

Dr. Rose's acceptance address was a masterpiece of well-chosen words, excerpts from which it is hoped will appear later in this JOURNAL. Mr. Elmer Davis, distinguished news commentator, gave the main address at the luncheon on the subject "Recent War Events". Members of the home economics and dietetic professions were honored guests at the speakers' table and included: Dr. Helen Judy Bond, president, American Home Economics Association; Miss Cleveland, president, New York State Home Economics Association; Mrs. Ruth Barker, president, Social Welfare, New York; Elizabeth Cole, Montefiore Hospital, New York; Lenna F. Cooper, Montefiore Hospital; Dr. Helen S. Mitchell, Massachusetts State College, Amherst; and Mary P. Huddleson, editor of this JOURNAL.

Other speakers during the sessions and their subjects, of particular interest to dietitians, were: Dr. Lena Madesin Phillips, "Consumers Are People"; Mabel Flanley, "Consumer Relations in the Grocery Industry"; Mr. Charles Wesley Dunn, "Federal Food, Drug and Cosmetic Act"; Mr. A. C. Nielsen, "New Facts on Food Marketing"; and Mr. Milo Perkins, "Programs for Marketing Agricultural Surplus".

Among those noted in the audience were the following: Doris Tisdale, Ina Lindman, Esther Kimmel, Edith Barber, Grace McLeod and Marye Danke.

Continuation Study Course for Dietitians. The University of Minnesota Center for Continuation Study is offering a three-day continuation course for dietitians January 29–31. The program will occupy the full time of those in attendance and evening sessions will be held the first two days. Tuition fee for the course is $5. Although room and board are optional, out-of-town residents will find the accommodations both convenient and economical. Rooms average $1.25 per day and meals are $1.50 per day. Garage accommodations nearby are available.

Enrolment will be limited to members of the American Dietetic Association and those whose training and experience would qualify them for membership. Those who are in doubt as to their eligibility may submit their applications to the Center for Continuation Study for review. Staff members of the University of Minnesota and distinguished leaders from other centers will lead the discussions and present demonstrations.

Since enrolment is limited, those who plan to attend should write immediately for application blanks to Dr. William A. O'Brien, director, Postgraduate Medical Education, Center for Continuation Study, The University of Minnesota, Minneapolis.

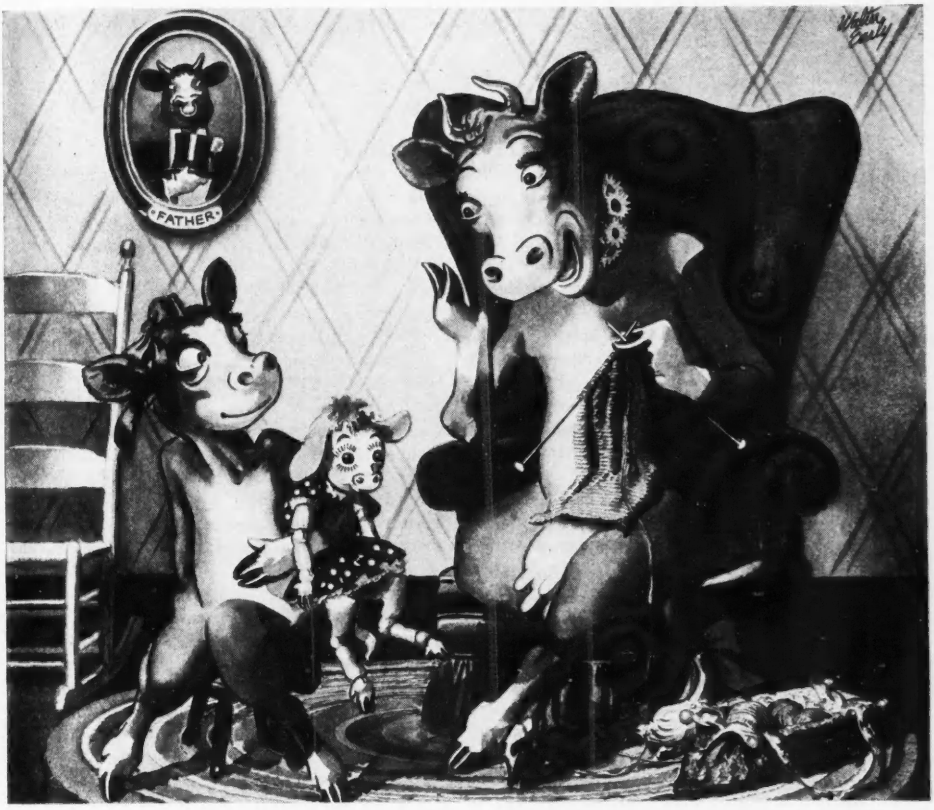
The list of prominent speakers who will appear includes the name of Dr. Eaton M. MacKay, Department of Research, Scripps Metabolic Clinic, LaJolla, California, and Dr. Martha Koehne, Department of Health, Ohio. In response to the requests for suggestions concerning subjects for study, the following have been submitted: personnel problems, therapeutic diets, hospital housekeeping, social welfare agencies, community education, normal nutrition, cost control, recent research in nutrition, standards for training employees, teaching methods, standard salaries, administrative problems, eight-hour shifts for employees in the dietary department, kitchen equipment, teaching normal nutrition to boys and girls, and nutrition in public health.

Gertrude Thomas, director of nutrition at the University of Minnesota Hospitals, writes that they are particularly anxious to reach dietitians in the Dakotas and Wyoming, where there are no state associations, so that some kind of affiliation may be effected with these states.

Fifth Annual Conference of Food Service Directors met at the Lord Baltimore Hotel, Baltimore, November 2–4 with over 300 in attendance and 22 states represented. Constance Hart was re-elected general chairman and Grace Helene Miller, treasurer. Mary Kelly of the Hartford, Connecticut, school system, was elected vice-chairman for the ensuing year. The Sixth Annual Conference will be held in Detroit in November 1940.

On November 2 the members of the Executive Committee were entertained at a dinner at the Johns Hopkins University Faculty Club as guests of the local committee. An informal reception followed in the Calvert Ballroom of the Lord Baltimore Hotel, with the Maryland Dietetic, Home Economics, and Restaurant Associations as hosts.

At the opening session on November 3, with Constance Hart presiding, the following program was presented: J. Ernestine Becker, "Recent



"Beulah, it's time you learned some of the facts of life!"

BEULAH, the calf, stared at Elsie, the Borden cow.

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Findings in Nutrition"; Dr. Martha Koehne, "Rural School Program as Part of the School Health Program"; Mr. Reginald Dunnock, "Educating the Public in a Commercial Cafeteria"; and Dorothea F. Behm, "Financial Reports". The annual banquet followed under the auspices of the Maryland Dietetic Association with Constance Hart presiding and Mary Faulkner as toastmistress. Dr. David E. Weglein, superintendent of public instruction, Baltimore, Alma E. Bering, president, Maryland Dietetic Association, and Mrs. Mary P. Huddleson, editor of this JOURNAL and representing the American Dietetic Association, extended the greetings of their respective organizations. Telegrams were also read from Mrs. Bond, president of the A.H.E.A., and Mrs. Marble, president of the A.D.A. The following addresses were then presented: Mr. Charles P. McCormick, president, McCormick and Company, Baltimore, "Multiple Management"; and Dr. E. V. McCollum, "The World's Nutrition Problems".

The morning session on November 4 opened with a round table and question hour with Alice Broadbent, William Hall High School, West Hartford, Connecticut, presiding, and Winning S. Pendergast, supervisor of School Lunchrooms, Detroit, leading a discussion on "Personnel, Equipment and Layouts for School Lunchrooms" in which Helen Southworth, Margaret Zimmerman and Mary M. Carothers, all of Detroit, and Mary Hemmersbaugh of Cleveland took part. An address followed by Mr. Charles W. Sylvester, director of vocational education, Baltimore, entitled "Feeding Youth in Baltimore Schools". A round table discussion of the topic "Lunch Problems in Small Schools" included short reports from rural areas by the following: Miriam L. Beall, Mary B. Riley, Katherine E. Braithwaite, and Catherine Leamy, all of Maryland, led by Marjorie Heseltine, nutritionist, Children's Bureau, U. S. Department of Labor, and summarized by Mary Spalding, nutritionist, Massachusetts Department of Health.

At the luncheon following under the auspices of the Maryland Home Economics Association, Grace Helene Miller, Board of Education, New York City, presided, and greetings were extended by Virginia Doub, president, Maryland Home Economics Association, and Mrs. Katharine Ansley, executive secretary, A.H.E.A. An address followed by Dr. Mary deGarmo Bryan, entitled "Education Through the School Lunch". At the closing session with Edna Gilbert, cafeteria director, the Rayen School, Youngstown, Ohio, presiding, Mrs. Quindara Oliver Dodge spoke on "Menu-making and Food Cost Control" and Mrs. Frances Livingston Hoag, Philadelphia Dairy Council, reported on "Study of Plate Lunches" and Alma E. Bering on "Study of Fish and Fish Products". A report of this conference would not be complete without mention of the unusually excellent educational exhibits which included a dramatic display designed to teach the nutritional and economic aspects of correct eating, arranged under the direction of Mrs. Eloise Troescher of Johns Hopkins Hospital; a display illustrating Maryland's fish industry arranged under the direction of Alma Bering; wax food models and charts to assist in health education, arranged by Mrs. Frances Livingston Hoag; and other beautifully arranged and interesting exhibits.

Eleven Food Projects Operated by W.P.A. in Illinois. According to *The Welfare Bulletin* of the Department of Public Welfare of Illinois, eleven W.P.A. diet projects, employing a total of approximately 290 workers, were operating in the state welfare institutions, on June 30, 1939, giving additional aid in the preparation and serving of special diets and menus, as reported by Mrs. Christine R. Pensinger, food and textile adviser of the department. This W.P.A. diet project for Illinois institutions is the only one of its kind operating in the country.

Each of these projects has a dietitian at its head, with a control clerk (who keeps time and records) and approximately 20 workers, all of whom are employed by W.P.A. The W.P.A. dietitian supervises her workers, and in turn is supervised by the state dietitian at the institution. Supervision over the project as a whole is by Mrs. Pensinger and by Mrs. Gladys Frazier, W.P.A. supervisor.

Esther Kimmel, formerly food and home management editor, *Pictorial Review-Delineator*, director of home economics, New York *Herald Tribune* Home Institute, and in 1932 national publicity chairman for the American Dietetic Association, has recently announced the establishment of "Food and Home Services" at her kitchen and office, 112 East 57th Street, New

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York. Miss Kimmel, whose work and abilities are well and favorably known to members of the American Dietetic Association, plans to give a "new type of fully personalized service" to manufacturers of foods and equipment, and others. She is in a position to offer ideas, advice, and consultation on food and cooking, on practical design and use of equipment, information for labels, and preparation of instruction booklets and leaflets. Production of individual recipes and literature on all phases of housekeeping are other available services. Miss Kimmel is also equipped to supply photographs, radio scripts, facilities for the testing of equipment and other services designed to assist the progressive manufacturer and distributor.

Second Harvey Lecture. Conrad A. Elvehjem, Ph.D., professor of agricultural chemistry, University of Wisconsin, College of Agriculture, Madison, delivered the second Harvey Society Lecture of the season at the New York Academy of Medicine on November 16. Dr. Elvehjem spoke on "The Biological Significance of Nicotinic Acid".

Young Women's Christian Association, Providence, R. I. Eleanor Wells, director of the School of Homemaking, has devised a new food history booklet which is being used in conjunction with the medical examination of all girls in the health education classes. The returns so far are rather revealing, according to Miss Wells, showing a dearth of green vegetables and fruits, and an excess of sweets, sodas and candies. The aim of this project is to obtain a history of food habits, to be recorded in the medical folder, with instructions in diet as well as in physical training. At the end of the year the experiment will be repeated, and improvements noted. The majority of the members are industrial workers, sometimes starting to work without breakfast, and receiving an inadequate lunch, according to their notations in the history booklet. The booklet is therefore a combination of effort between the Physical Education and Homemaking Departments.

Sister M. Alexius. Announcement has just been received of the death of Sister M. Alexius, who was a life member of the A.D.A. She attended Drexel Institute in 1909 and Temple University in 1917, and had been at St. Agnes' Hospital, Philadelphia, for nearly 30 years.

Women At Work, published by the New York Career Tours Committee, of which the American Dietetic Association is one of the sponsoring organizations, is now available at 50 cents per copy, on application to The New York Career Tours, 353 West 57th Street, New York. Quantity orders of ten copies, mailed to one address, are available at $4.00, twenty-five copies at $8.00.

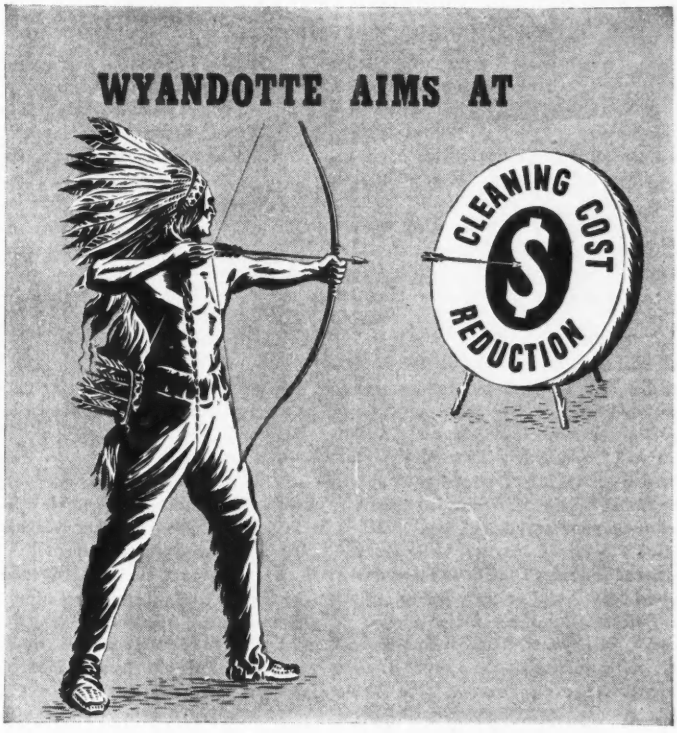
Colorado Dietetic Association. The November meeting was in the form of a luncheon party at the Denver Y.W.C.A. with the following program: "Motion Picture and Talk on the Birds Eye Frozen Foods", Mr. Spade, Denver; "Labor Turnover", Mr. Frank J. Walter, superintendent, St. Luke's Hospital, Denver; and "The National Convention at Los Angeles", Doris Odle, Presbyterian Hospital, Denver.

Delaware Dietetic Association. The first fall meeting of this association, recently affiliated with the national, was held October 25 in Wilmington. Dorothy Hull of the Homeopathic Hospital, president of the state association, presided at the dinner and Fern Brown of the Wilmington General Hospital was chairman of the meeting which followed. Ione Warren of the Delaware Hospital, delegate to the national meeting in Los Angeles, was the speaker. Miss Warren presented a report on the meetings and discussed high lights of her trip to the coast by air.

Mary Warmuth, formerly of St. Mary's Hospital, Quincy, Illinois, and St. Peter's Hospital, Brooklyn, New York, has accepted a position as dietitian at the St. Francis Hospital in Wilmington.

Willow Satterfield is now on the dietary staff of the Philadelphia State Hospital. Her previous position at the Delaware State Hospital, Farnhurst, is being filled by Josephine Adams, a former member of the dietary department of the Latter-Day Saints Hospital, Idaho Falls.

Henrietta Fleck, professor of foods and nutrition at the Women's College, Newark, visited Belgium, France, Holland and England this past summer.



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Several members attended the Conference of Food Service Directors held in Baltimore November 2–4.

Charlotte Barnhart, graduate of Pennsylvania State College, has replaced Eleanor Youse as assistant dietitian at the Women's College, Newark. Newly elected officers of the association are president, Dorothy Hull; vice president, Charlotte Spencer, state nutritionist, Dover; secretary, Anna Gaventa, Delaware Hospital; and treasurer, Eleanor McKnight, Milford Hospital, Milford.

Pearl MacDonald, chairman of the program committee, has planned interesting sessions for the coming year. J. Ernestine Becker, Johns Hopkins School of Hygiene, Adeline Wood, New York, Emily King of the State Department of Public Instruction, and Dr. Joseph Gould of the University of Delaware are among the speakers scheduled.

District of Columbia Dietetic Association met on November 6 at Chestnut Farms, Chevy Chase Dairy Auditorium, where Winning S. Pendergast, supervisor of School Lunchrooms, Detroit, and president of the Detroit Dietetic Association, spoke on "Feeding The Young Public".

Iowa Dietetic Association. Dr. Elizabeth Gregory, School of Household Science, University of Otago, Dunedin, New Zealand, spoke to the members of the association at their luncheon meeting at the University of Iowa, Iowa City, November 9. Dr. Gregory told of the nursing service available to New Zealand mothers both before and after the birth of their children. Approximately 40 members of the association attended the luncheon, among them three from New Zealand, Miss Martin and Miss Naylor who are taking their dietetic internship under Dr. Kate Daum at the University Hospitals, and Isobel Crowe of the institution management staff at Iowa State College.

Preceding the luncheon, Dr. Robert E. Neff, administrator of the University of Iowa Hospitals, told the group that as administrators they cannot possibly know all the details of every department but should provide adequate supervision to see that work is carried out as planned. He also stressed the importance of giving proper attention to complaints and criticisms, and voiced the growing opinion in favor of higher wages for employees rather than giving board as part of their remuneration.

At the business meeting, Dr. P. Mabel Nelson, head of the Foods and Nutrition Department at Iowa State College, recounted the events of the Los Angeles meeting, and mentioned a new drug thought to be effective in treatment of obesity, as well as recent findings that a salt-free diet is not essential in the treatment of Bright's disease.

The group inspected the dietary department of the University Hospital, after which Dr. Reuben Flocks gave an illustrated lecture on "Calcium and Phosphorus in Relation to Kidney Stones."

Dr. Everett Dudley Plass of the University staff told of some interesting results obtained with a high protein intake (up to 150 grams) and little or no sodium chloride, in dietary management of toxemia in pregnancy.

The program included a tour of the addition to Currier Hall which in its entirety will house approximately 550 women students, and pays a tribute to the wise planning of Hazel Swim and Mary Payne in charge of Housing and Food Service. Tea served in the Currier Hall parlors added a fitting touch to the gracious hospitality of the hostesses.

The spring meeting of the association will be held at Des Moines in conjunction with the Iowa Hospital Association which convenes April 22–24.

Maryland Dietetic Association. On October 23 about sixty members of the association journeyed to the Western Maryland College at Westminster, Maryland, where they were entertained at supper with Daisy Smith, head of the Home Economics Department, as hostess and the senior home economics students serving delicious food as a project in their quantity cookery course. Dr. Fred S. Holloway, president of the college, greeted the guests. Following the supper, Lillian Shipley spoke on "The Romance of Pattern Glass" and exhibited many beautiful and interesting specimens from her collection of over four hundred pieces. The guests then visited the cooking laboratory and the practice house.

Alice Burgoin has taken over the duties of director of Dining Halls and instructor in

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Institutional Management at the University of Maryland, College Park. Miss Burgoin for some years has been with the staff of Cornell University.

Anne Hackett, a former student at the University Hospital, University of Maryland, Baltimore, was relief dietitian for three months during the summer at the Marine Hospital. She is now assistant dietitian at South Baltimore General Hospital.

Dorothy Chittum has accepted the position of dietitian at Spring Grove Hospital, Catonsville, Maryland.

Margaret Pollard, a graduate of the University of California and of the Seattle Course for Hospital Dietitians, has accepted the position as assistant dietitian at Sheppard Pratt Hospital. Miss Pollard was a former student of Agnes Fay Morgan at the University of California.

Margaret Sloan, a graduate of Drexel Institute, has been engaged as the first dietition to be employed at the Laurel Sanatorium, Laurel, Maryland.

Mrs. Lucy Johnson is in charge of the Dietary Department at the West Baltimore Hospital.

The Business and Professional Women's Club of Baltimore invited the Maryland Dietetic Association to attend the Friendship Dinner of the Women's Service Clubs of Maryland on November 16 at the Baltimore Country Club.

Lucille Thomas, graduate of Hood College, is now assistant therapeutic dietitian at Johns Hopkins Hospital, and is also working part-time in the Food Clinic.

The following students, in addition to those whose names appeared in the November JOURNAL, have begun their postgraduate course in dietetics at Johns Hopkins Hospital: Janet Bear, Texas State University; Elizabeth Brown, University of New Hampshire; Janet Engebretson, University of Wisconsin; Dorothy Gibson, Michigan State University; Grace Levis, Hood College; Marjorie Lipp, University of Wisconsin; and Ernestine McLemore, University of Arkansas.

Woot Tsuen Wu, who has been studying for her doctor's degree at Pennsylvania State College, is observing in the Dietary Department of the Johns Hopkins Hospital for a period of four months.

The Maryland Dietetic Association as well as the Johns Hopkins Hospital dietary staff are very happy to have Phyllis Rowe back again after a prolonged illness.

Massachusetts Dietetic Association. The October meeting was held at the Women's Educational and Industrial Union, Boston. Dr. W. P. Murphy, Harvard Medical School and the Peter Bent Brigham Hospital, gave an illustrated lecture on "Nutritional Deficiency and Anemia".

Helen Jacobs has resigned her position at Boston Lying-in Hospital to take a position at the Hartford Retreat, Hartford, Connecticut.

Geneva Marble has left the Massachusetts Women's Hospital and is now dietitian-in-chief at the Boston Lying-in Hospital. Roberta Johnson, who took her student work at the Peter Bent Brigham Hospital, is to take Miss Marble's place at the Massachusetts Women's Hospital.

Elizabeth Sears, a Massachusetts General Hospital student, has been appointed dietitian at St. Luke's Hospital, New York City.

The third annual conference of the New England Community Nutritionists was held at the College Club, Boston, September 30. Mary Spalding, of the Massachusetts Department of Public Health, acted as chairman. Bertha Burke, of the Harvard School of Public Health; Blanche Dimond and Isabelle Ackerman of the Community Health Association; Charlotte Raymond, nutritionist of Newton, Massachusetts; Frederica Beinert and Dorothea Nicoll of the Massachusetts Department of Public Health; Florence Dornard, Springfield Nutrition Service Bureau, Helen Henman, New Hampshire Department of Health; and Grace Bixby, nutritionist in Norwood and Milton, Massachusetts, led discussions on modern problems in nutrition. It was interesting to learn that all of the New England states now employ one or more nutritionists. Dr. M. Louise Diez, Massachusetts Department of Public Health, presided at the luncheon. Bernice Blackman, chief of social service, Baker Guidance Center, spoke on "How to Change Attitudes Towards Nutrition Needs".

Ruth L. White, Forsythe Dental Infirmary, spoke on "Diet and Personality" before the Brookline Women's Club, October 23.

The November meeting was held at the Women's Educational and Industrial Union, Boston. Ida Cannon, chief of social service

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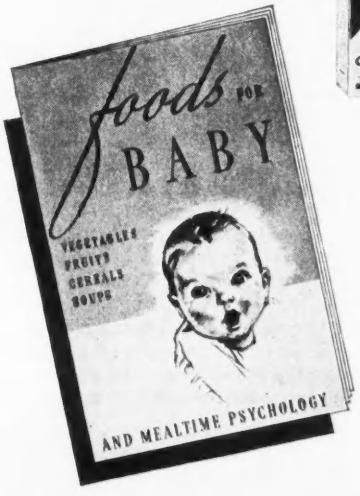
Accepted by the Council on Foods of the American Medical Association, this new book provides accurate statements on the technique of infant feeding and accepted information on the development of good food habits.



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at the Massachusetts General Hospital, spoke on "Some Common Interests of Dietitians and Social Workers in the Field of Nutrition".

Carolyn Roop, assistant dietitian at the Free Hospital for Women, and Dr. Richard Pettit, house officer at the Boston Lying-in Hospital, were married at the United Baptist Church in Middleton, Nova Scotia, December 16.

Gladys K. Murray, a nutritionist at the Harvard School of Public Health, was married to Mr. Thomas V. Learson, November 4, at St. Patrick's Cathedral, New York.

Annie MacLeod, a recent graduate of the Beth Israel Hospital training course, has accepted a position as dietitian at the Taunton Hospital, Taunton, Massachusetts.

Michigan Dietetic Association. Approximately 70 members and guests met at Butterworth Hospital, Grand Rapids, November 1. The all-day program presented a number of outstanding speakers, who reported on various topics of interest to dietitians.

Carey Worman, president, Western Michigan Dietetic Association, presided at the morning meeting with the following program: Barbara Dell, Michigan Welfare Commission, "Present Status of Nutrition in the Relief Program", Mildred Jones, Institution Division, Michigan State College, "Trends in the Planning of Equipment"; Lucille M. Hall, Michigan Consolidated Gas Company, "Foods on the Radio"; Dr. L. V. Ragsdale, director, Butterworth Hospital, "Group Hospitalization for Hospital Personnel" and Coralie Green, Harper Hospital, "Report of the Ulcer Diet Study Committee."

Mary I. Barber, Kellogg Company, Battle Creek, president-elect of the American Dietetic Association, gave a stimulating talk at the luncheon meeting at which Mayme Lewis, president of the state association, presided.

In the afternoon, Hazel Terrell, Blodgett Hospital, introduced Dr. Lillian Storms, Gerber Products Company, who presented a "Report of the Institute of Nutrition with Special Reference to Fortification of Foods". Mable MacLachlan, chief dietetian of the University Hospital, Ann Arbor, then conducted a question and answer hour.

Following a visit to the "House of Today" at the Grand Rapids Furniture Museum, the meeting ended with a tea at the Women's City Club, with members of the Western Michigan Dietetic Association as hostesses.

Mary M. Harrington of Harper Hospital, Detroit, has recently received two signal honors. She was elected to membership in the Detroit Physiological Society, to which few women belong, and she has been selected as the dietitian on the Advisory Council of the Detroit Diabetes Association.

Minnesota Dietetic Association. The first of the season's meetings was held November 7 at the Cafeteria Building on the University Farm Campus. Planned by the Committee on Administration, headed by Frances Dunning, the program consisted of greetings from the president, a short business meeting, a report of the breakfast meeting for directors of approved courses, by Gertrude I. Thomas, and reports of the state presidents' luncheon and other features of the A.D.A. meeting presented by Ellen Satre, Lyl Borak and Margaret Drew. A panel discussion followed on personnel problems in relation to a straight 8-hour shift, under the leadership of Lucille Townsend, Mildred Hinicker, Harriet Warmington and Winifred Erickson. Officers for the year 1939–40 are: president, Hazel Brown; vice-president, Lorene Kulas; treasurer, Elizabeth Schofield; recording secretary, Chrissa Wendt; and corresponding secretary, Marie Fahey.

Nebraska Dietetic Association elected Lydia Beck, Methodist Hospital, Omaha, president at its annual meeting October 4, 1939, at the Cornhusker Hotel, Lincoln. Miss Beck succeeds Miss Donahoo of Lincoln.

Ardith Wick, University hospital, Omaha, was named vice-president. Della Caster, Lincoln, is secretary, and Gertrude Birkholz, Lutheran Hospital, Norfolk, is treasurer.

The election was held during the business session, at which the annual membership dues were increased from one to two dollars. Miss Donahoo welcomed delegates, and Dr. Rebekah Gibbons presided. Oscar Bennett, head of the Department of Fine Arts at Nebraska Wesleyan University, entertained with vocal solos.

Ruth Menoher, Iowa-Nebraska Light and Power Company, discussed the subject "Shortening Hours with Electricity". She displayed an interesting exhibit of electrical appliances.

Ruth Lusby, institution director of the College

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of Agriculture and Home Economics, spoke on "Standardized Buying Procedures for the Institutional Director". Her talk was summarized in twelve questions which the institution director should ask herself in connection with each purchase.

Following the luncheon at the hotel, the thirty delegates went to the Bryan Memorial Hospital to participate in a clinic in conjunction with the Lancaster Medical Association, at which Dr. Elliott P. Joslin, Boston, nationally known authority on diabetes, was the principal speaker.

Greater New York Dietetic Association. Mary I. Barber, president-elect, American Dietetic Association, was the speaker at the meeting November 20 in the auditorium of the Nurses' Residence, St. Luke's Hospital, New York. Miss Barber's subject was "The Facts About Your Food".

On December 6 the association met at the Beekman Towers Hotel with Mr. Edwin T. Gibson, president, Frosted Foods Sales, speaking on "The Economics of Food Distribution". At this meeting members were asked to bring a gift for a child of any age up to fourteen to make a cheerier Christmas for the children of St. Luke's Convalescent Home.

Oklahoma Dietetic Association. Mrs. Freda S. Johnson succeeds Mary Barnes as president of the state dietetic association. Other officers are: vice-president, Veda Bailey, Wesley Hospital; secretary, Josephine M. Barr, formerly of St. Anthony's Hospital; treasurer, Vera Parman, College Cafeteria, Stillwater.

Mary Barnes, formerly dietitian at the Murray Dormitory, Oklahoma A. & M. College, Stillwater, is now at the University of Michigan Dormitories, Ann Arbor.

Vera Parman resigned her position at the Eastern Oklahoma State Hospital, Vinita, and is now dietitian at the College Cafeteria, Stillwater.

Mrs. Owen Royce is now a resident of Oklahoma City and a member of both the state and city dietetic associations. Mrs. Royce was formerly Olive Ludwig of Milwaukee, and before her recent marriage was dietitian at the Milwaukee County Institutions.

The following student dietitians completed their training at the Oklahoma State University Hospitals on August 31, and are located as follows: Dorothy Baker, Presbyterian Hospital, Chicago; Aileen Christy, St. Joseph's Hospital, Bellingham, Washington; Mary E. Cumbie, Miners' Hospital, Raton, New Mexico; Helen Smith, St. Mary's Hospital, Port Arthur, Texas; Novelle Tucker, College Cafeteria, Stillwater; Wilma Young, Grace Hospital, Morganton, North Carolina; Elizabeth Lefferdink and Mary Frances Self are at home, and Maurine Grizzell is still in training.

The new students who began their year's training at the Oklahoma State University Hospitals in September are: Helen Collins, Colorado State College; Dorotha Crockard, Iowa State College; Dorothy Dreyer, Milwaukee-Downer College; Elizabeth Jones, University of Nebraska; Helen Kantor, University of Minnesota; Patricia Rooney, Mount Mary College; Kathryn Spetz, University of Montana; and Martha Spradlin, Texas State College for Women.

St. Anthony's Hospital graduated four student dietitians in September and they have received the following appointments: Mary Moran, St. Anthony's Hospital; Alfreda Sloan, Ashville Junior College, North Carolina; and Ollie Agneborg, Ponca City Hospital, Oklahoma. Juell Little will continue her training until January.

The new class of student dietitians entered in September at St. Anthony's Hospital are: Dian Keith, Central State Teachers College; Marjorie Rose, Purdue University; Helen Trieschman, Purdue University; Phyllis Murphy, Marymount College, Leavenworth; Florence Britton and Ella Fikes, both of St. Mary's, Leavenworth.

Florence Dietrich, a recent graduate of the Johns Hopkins Hospital Dietary Department, is now in charge of the Catering and Banquet Service at the Y. W. C. A. Cafeteria, Oklahoma City.

The Oklahoma City Dietetic Association held their first meeting this fall at St. Anthony's Hospital, and the following officers were installed for the year: president, Mary Wilkinson, University Hospital; vice-president, Maxine Turner, state nutritionist; secretary and treasurer, Mary Moran, St. Anthony's Hospital. The October meeting was in charge of the St. Anthony's Hospital student dietitians. They presented papers discussing buying specifica-

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The effectiveness of utilizing plain Knox Gelatine in treatment of peptic ulcer has recently been reported.* In a group of forty patients, 36 (or 90%) were symptomatically improved; 28 of these (or 70%) experienced immediate relief of all symptoms. Other than dietary regulation which included frequent feedings of plain Knox Gelatine, no medication was given except an occasional cathartic.

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* **"PEPTIC ULCER**—The Effect of High Protein Diet on the Behavior of the Disease" by Windwer and Matzner, Am. Jl. Dig. Dis. 5:743, 1939.

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tions for fresh fruits and vegetables, and the training of student nurses in the diet kitchen. Ann Haines of St. Anthony's Hospital entertained the group with movies and comments on her trip to the West Coast this summer as state delegate to the national convention in Los Angeles.

Maxine Turner, state nutritionist, was recently elected vice-president of the Oklahoma State Public Health Association.

The Oklahoma City Dietetic Association held a joint meeting with the Oklahoma State Hospital Association on November 17, 1939. Speakers for the dietetic meeting included: Veda Bailey, dietitian, Wesley Hospital, "Food Psychology and the Dietitian"; Dr. Owen Royce, State University Hospital Staff, "Diabetes and Infections"; and Maxine Turner, nutritionist, State Health Department, "The Nutritionist in the Public Health Program". Mrs. Margaret Durrett, dietitian, Oklahoma City General Hospital, representing the city dietetic association, spoke to the general assembly of the hospital group Thursday morning on "Dietary Administration in a Small Hospital."

Philadelphia Dietetic Association elected the following officers for the coming year: president, Anna DePlanter Bowes, Philadelphia Child Health Society; vice-president, Elda Robb, Temple University; secretary, Marjorie Euwer, Hospital of the University of Pennsylvania; treasurer, Miriam E. Gaige, Philadelphia General Hospital; Executive Committee members, Evelyn A. Carpenter, Philadelphia Hospital for Contagious Diseases, Marjorie E. Bacheller, Beaver College for Women, and Martha E. Tarbox, Pennsylvania Hospital; historian, Katherine E. Louser, Norristown State Hospital; hospitality, Betty J. Brewer, Presbyterian Hospital; membership, Florence F. Williams, Pennsylvania Hospital; program chairman, Elizabeth Miller, Philadelphia General Hospital; special diet chairman, Frances L. Swenson, Mount Sinai Hospital, and publicity chairman, Alice M. Karslake, Temple University Hospital.

Three articles about prominent local dietitians appeared in the morning Philadelphia *Record* this past fall, one on the work of Dorothy M. Mittelstadt, chief dietitian, Presbyterian Hospital, one about the dietary department at Jefferson Hospital under Martha Walker, and the third reviewing the scope of the department at Jewish Hospital under Helen Paynter and her first assistant, Katherine Williams.

The American Dietetic Association sent material for an exhibit at the American College of Surgeons' annual meeting at the Bellevue-Stratford Hotel, Philadelphia, October 16–20. The booth was set up and staffed by members of the local association.

The first meeting of the year was a box supper at Drexel Lodge on September 26. The business meeting following was enlivened by reports of a day at the national convention by Ann Becker, and a trip to Alaska by Henrietta Pribnow.

On October 10 the Executive Committee members were privileged to have dinner with Dr. Helen S. Mitchell of Massachusetts State College, who was the speaker at the meeting later in the evening at Temple University. Her topic, "Developing Embryo Dietitians" was of particular interest to dietitians who teach students, and to the guests, the student dietitians and home economic students from the city.

The second meeting in October, given over to speakers from *Modern Hospital*, had hospital administrators as guests. Dr. Joseph C. Doane, editor, and Dorothy DeHart, Food Service editor, made short introductory remarks followed by Raymond P. Sloan, associate editor, who spoke on "Extra-Curricular Activities".

The first copy of this year's *Know News*, a local sheet describing the activities, both professional and social, of the Philadelphia Dietetic Association and its members, was distributed at this meeting. It included the average weekly food cost for staples and the cost per week for the various special diets based on these figures and the "Low Cost Special Diet Booklet".

Professor George C. Galpin spoke on "Modern Trends in Education" and Marjorie Sims discussed the place of economics in the educational program at the November 14 meeting.

On November 21, Sister M. Bernadine, dietitian at Fitzgerald Mercy Hospital, invited the members to a demonstration of the "trayveyor" system in use in the central tray service at the hospital. Both private and ward trays are served rapidly and satisfactorily to both patient and dietitian.

Pittsburgh Dietetic Association held its monthly meeting, October 3, in the Pittsburgh

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District Dairy Council. A record attendance heard Miss Eckman, delegate to the California meeting of the A.D.A., give a detailed report of the meetings and papers.

Irene Wilson, chief dietitian, Shadyside Hospital, Pittsburgh, spoke on "Dietetics in Diabetes" before the State Diabetic Commission Session of the Allegheny County Medical Convention held in Pittsburgh, October 2–5. Miss Wilson explained the correlation of the hospital diet and the practical application of the same diet to home conditions.

The members were entertained at a dinner on November 2, at the Fort Pitt Hotel with the Meadow Gold Dairies Inc., as hosts. Mr. Hubbard, president and general manager, spoke on "Frosted Foods". Frosted food products were served at the dinner. Mr. Kinney, bacteriologist, presented slides dealing with the production and delivery of homogenized milk. Sixty members attended the dinner and a lively discussion followed Mr. Hubbard's address.

The dinner was also the occasion for presentations to Audrey Oakley, now Mrs. Gerwig, and to Genevieve Malloy, assistant dietitian, Montefiore Hospital. Miss Malloy is leaving Pittsburgh to become assistant dietitian in St. Elizabeth's Hospital, Covington, Kentucky. Miss Malloy was also entertained at dinner at the Montefiore Hospital and at a dinner at the Arlington Hotel, followed by a theatre party. She has been very active in the local association, and leaves a host of friends in Pittsburgh.

On November 7, the monthly meeting was held in the lecture hall of Allegheny General Hospital. Dr. Max Schoen, head of the Psychology Department, Carnegie Institute of Technology, was the guest speaker, his subject, "Psychology of Living".

Gladys Murray, program chairman, was hostess to the officers and Executive Committee at a luncheon November 9, held in the Sewickley Valley Hospital, Sewickley, Pa. Plans for the coming year were discussed.

Clarissa McCullough, former assistant dietitian at Altman Hospital, Canton, Ohio, is now assistant to Jeanette Morris, Elizabeth Steel Magee Hospital, Pittsburgh.

Celeste Coufal, graduate of the University of Nebraska and student dietitian at Pennsylvania Hospital, Philadelphia, is now assistant dietitian at Montefiore Hospital, Pittsburgh.

Miss Lowney, formerly of the Woodville County Home, Woodville, Pennsylvania, is now dietitian at Dover Hospital, Dover, Ohio.

Rhode Island Dietetic Association. At the November meeting, Mr. Homer Huntington of the New England Fresh Egg Institute gave an illustrated talk on "Give the Fresh Egg a Break". He called attention to the fact that although egg production is increasing with scientific handling, consumption is decreasing.

The December meeting was concerned with foreign Christmas foods and customs. Mrs. Lucia Sarkissian, the Armenian secretary of the Providence International Institute, wearing native dress, discussed customs in the Near East. "Paklava", the festival pastry of Armenia, and Turkish coffee were served as refreshments. Foreign recipes were distributed and foreign cook books were on exhibit. Eleanor Wells had compiled a small booklet on holiday customs and menus of the Armenian, Portuguese, Italian and Russian nationalities for distribution at the meeting.

At the January meeting, to which the Home Economics Association are invited guests, Sarah Thomas, A.D.A. member and director of the cafeteria and instructor in home economics administration at Rhode Island State College will present a meat demonstration, discussing various cuts and how to use them. Florence Caton, Providence City School Home Economics supervisor, assisted in obtaining the use of a high school cafeteria for the meeting. The Providence Public Market will provide the beef carcass.

S. Margaret Gillam will be the speaker at the February meeting of the association and Mary I. Barber, president-elect of the A.D.A., has consented to speak at the annual meeting in June.

Saint Louis Dietetic Association. Officers elected to serve during the 1939–1940 year are: president, Theodora H. Stebbins; vice-president, Vivian Benecke; secretary, Mildred Frier; treasurer, Mary Catherine St. John.

The president has appointed the following section chairmen: Regina Gottlieb, Administration; Marie Harrington, Community Education; Grace Zerbolio, Diet Therapy; Ruth Kahn, Professional Education. The following are committee chairmen: Hospitality, Elizabeth

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A dinner meeting was held in October at Garavelli's Italian Restaurant. Mrs. John F. Brocken, the speaker of the evening, presented a humorous reading, "Burlesque on the English Ballad", at one of the best attended meetings held by the association.

The November meeting was a visit to the Font Bonne College Home Economics Department. The Professional Education Section arranged the program and introduced Sister Jeanne d'Arc, head of the department, who presented a most stimulating paper on, "Phases of Research in which the Dietitian May Participate." The students in the department served refreshments after the program.

Hilda Hartman, formerly of DePaul Hospital, has joined the staff of St. Mary's Hospital, Rochester.

Mary McCarthy, former student, St. Louis University Hospitals, has accepted a position at DePaul Hospital.

Genevieve Hammar, a recent graduate of Barnes Hospital, was added to the Barnes staff on September 1.

Jennie Hartling and Emily Wuelfing, also recent Barnes Hospital graduates, have accepted positions as assistant dietitians with the University City Public School Cafeterias.

Vera Cernick, formerly with the General Electric Company, is now directing the food program at KWK Broadcasting Station, Saint Louis.

Texas Dietetic Association. The November issue of the state *Bulletin* celebrated appropriately enough the third anniversary of its publication with a frontispiece of Mamie Ruth Harris, editor, Blake Bryson Patrick, assistant editor, and Tony Bracher and Gladys Lyons, business managers, proudly viewing the birthday cake. Congratulatory greetings followed from the association's first president, Mary E. Smith, the *Bulletin's* first editor, Irene Pope Hardy, to whom great credit is due for her excellent work as editor, Nell Morris, state president, and Selma Streit. Greetings were also extended by Mrs. Marble, Dr. Bryan and Mrs. Dodge, speakers at recent annual meetings of the state association.

The November issue also carried feature articles on equipment and layouts, a generous report of the annual meeting of the American Dietetic Association at Los Angeles by Mary E. Smith, state delegate, an appetizing array of photographs of various meal services by Ella A. Schwartz, Tony Bracher, Mozelle Craddock and Mary Bowling Clark, and ways of getting "Something for Nothing" by Elizabeth Atkerson. Another interesting feature concerned new advancements and information with regard to the products and activities of the commercial firms whose products are distributed in the Texas area.

Virginia Dietetic Association. Mrs. Bernice Raney Varney, president of the association, has been appointed head of the Home Economics Department of Madison College, Harrisonburg, Virginia. Mrs. Varner taught at Peabody College, Nashville, Tennessee, during summer school.

Mabel Gladdin has returned to Virginia as chief dietitian at St. Elizabeth Hospital, Richmond.

The Richmond Dietetic Association is planning to publish the R. D. A. *Bugle*, a news bulletin concerning both the local and the state associations.

Evelyn Neale, past president of Virginia state association, was married in August to Mr. Kenneth R. Hyde, manager of Hotel Roanoke, Roanoke.

Mary Grace Trout, dietitian at Jefferson Hospital, Roanoke, was married in June to Mr. Marvin Lemon of Roanoke.

Margaret Poindexter, dietitian at University Hospital, Charlottesville, was married in September to Mr. Taylor of Norfolk.

Mary Alice Grantham, formerly assistant dietitian, has been appointed chief dietitian at University Hospital, and Rose Porter, assistant.

Anna O'Leary has returned to the position of dietitian at Catawba Sanatorium.

Mary Burnett has been appointed to a position at Western State Hospital, Staunton.

Mary Sartorius has accepted a position at Virginia Polytechnic Institute at Blacksburg.

Ada Feltch is the new assistant dietitian at Madison College, Harrisonburg.

Wisconsin Dietetic Association. The Milwaukee Dietetic Association began its fall activities October 16, 1939, at the Milwaukee Children's Hospital, with Nell Clausen and

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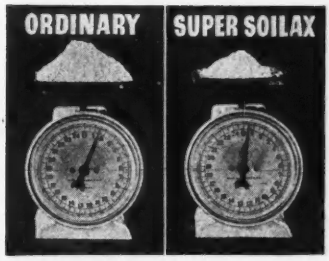

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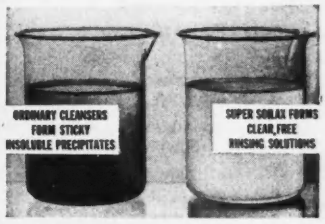

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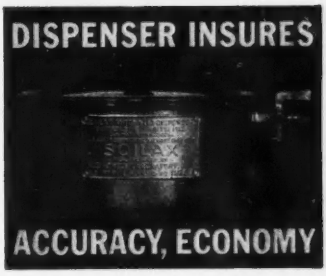

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Magna Werra as hostesses. The event was a "Fiesta as Seen in Old Mexico." Not only was the motif Mexican but the music, dancing and menu emphasized the idea. The A.D.A. meeting at Los Angeles was the main theme: the meeting of the House of Delegates, the general meetings, and interesting foods and eating places during this visit to the West Coast. The National Restaurant Convention was also reported by Nell Clausen, Ethel Keating, Doris Johnson, Ella Liner Lambert and B. Luther Griem. Theresa I. Goetz, Veterans' Administration Facility, gave a summary of her A.D.A. project, "Food Service in Large Institutions."

Susan F. West, Milwaukee-Downer College, has returned from a European trip. She spent the summer directing a group which studied special home economics interests as found in England and Scandinavian countries and on the Continent. Nutritional laboratory, housing, crafts and pottery, were some of the special interests. Miss West has spoken before various groups since her return and has made some very interesting observations, and much interest has been shown in her presentations.

Mary Bergin, formerly of Misericordia Hospital, Milwaukee, is a new member of the dietary group at Milwaukee County Hospital. Catherine Coffey has accepted the position at Misericordia Hospital.

Mayme Lenzmeier, formerly of Ashland, is now at Riverview Sanatorium, Kaukauna, Wisconsin. She is doing a pioneering job as a dietitian at this institution, being the first one there. The state dietetic association is indeed pleased at Dr. Boyd's interest in obtaining the services of a dietitian.

Dorothy Gramling, St. Joseph's Hospital, Milwaukee, resigned during the summer and is to be married in the near future.

The Executive Committee of the state dietetic association had an interesting meeting at Ann Emery Hall, Madison, with Lillian Otto Fried as hostess. Committees were named and preliminary plans made for the convention to be held at Madison next March.

On October 19 three members of the state association were luncheon guests at the Household Training Center, Milwaukee. Jeanette Oberndorfer, supervisor of the project, told of the aims of the school and some of the opportunities that had been offered to those completing the course. This W. P. A. Household Workers' Training Project offers very unusual opportunities and is a project that home economics workers would rate as emphasizing vital subject matter in a practical and unusual way.

The state dietetic association met November 1, at the Cudworth Memorial Post, with Theresa I. Goetz as chairman of the meeting. L. Marie Newman, personnel manager of the Northwestern Mutual Life Insurance Company, gave an excellent talk on personnel management.

A number of the state dietetic association members participated in the meeting of the Wisconsin State Home Economics Association, November 1–3. The program emphasized the new guide for teaching home economics, recently released. The organization of this guide is most unusual. Susan F. West gave the story of the development of the subject matter at the foods and nutrition session. Opportunity was given various groups to comment on their experiences with the new presentation of this material. Ada B. Lothe presided at the meeting.

Members of the Milwaukee Dietetic Association assisted at the tea given during the time of the Wisconsin State Home Economics Association meeting as follows: Grace Clark Ullmann, Dorothy Belknap, Janet Wing, Elizabeth Tonigan and Ethel Keating.

Abby L. Marlatt spoke before the Milwaukee Home Economics Club, October 7. She has addressed this group at its opening luncheon every year since its organization with two exceptions. Her subject this year was "Eugenics: Has it a Message to the Modern Home?" The club's theme for the year is modern home making.

The Milwaukee Dietetic Association has the following new members: Winifred Loomis, Columbia Hospital; Vivian Testa, St. Joseph's Annex; Hattie Gesner, Boston Store; Elinor Ellison, Milwaukee County Hospital, Milwaukee; Esther Roob, St. Mary's Hospital; and Alice Sylvester, St. Luke's Hospital, Racine. Esther Deppe Shellman has been reinstated.

Nell Clausen recently addressed the Wauwatosa Woman's Club on the subject of "Nutrition." On October 7 she gave a demonstration and lecture to a parent-teachers' organization

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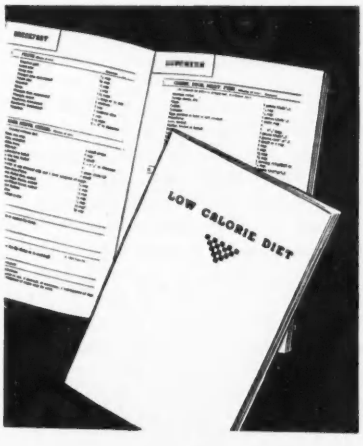

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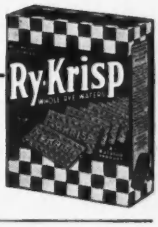

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The annual convention of the Wisconsin Dietetic Association will be held March 29–30, 1940, at the Loraine Hotel, Madison.

News from our Advertisers and Exhibitors. The Home Economics Department of the *American Can Company* announces the introduction of the Canco paper milk container. In the dairy industry the Canco single service container for milk represents a similar improvement resulting in more efficient, economical, sanitary handling of milk. For the housewife this container means greater convenience in the kitchen, less work, less bother, and greater sanitation in the handling of the liquid food so essential to the health of her family.

Mead Johnson & Company again call attention to the need of vitamin D supplements to the diet of the infant and child during the winter months. Winter sunshine in most sections averages 10–50% less than summer sunshine, the quality is inferior, and the hour of the day has an important bearing. Clothing also shuts off the winter sun from the child's skin. Unlike winter sunshine, the value of Mead's antiricketic products does not vary from day to day or from hour to hour.

Now one small capsule can do the work of comparative massive doses of antacid liquids or powders, state *Hoffmann-La Roche, Inc.* in introducing their new "Syntrogel Capsules" for the treatment of gastric hyperacidity. In brief, the action of this new product, in the words of the makers, is "to absorb and neutralize acid, mildly and without provocation to further acidity, to relieve flatulence, and to overcome spasm and hypersecretion." Since the stated purpose is to dispose of excess quantities of acid without the increased compensatory flow excited by a high alkaline condition, Roche chemists found it necessary to develop a new form of aluminum hydroxide with improved adsorptive properties, now known as "Aluminum Hi-gel 'Roche' ". The action of Hi-gel is to absorb large quantities of stomach acid and hold it in suspension as jelly. To provide neutralizing agents which would alkalize to the point of neutrality, but would go no further on the alkaline side to reinduce hyperacidity, calcium carbonate and bismuth subcarbonate were selected. Both are fast neutralizers and are soluble only in acid.

Have You Heard?

In laundries and institution linen rooms, linen is put on the shelves in stacks of ten. If this practice is followed in handling dietary department linen, much time is saved in issuing the linen and taking inventory. The linen is usually put on the shelves at an hour when there is time to do this counting—in fact in many hospitals it will be found that the stacks of ten can just as well be sent from the laundry—and time is saved when the issues are made.

Ten is used as the unit rather than a dozen because of the easier arithmetic involved.

When an inventory of flat silver is taken in the institution, it is quicker to weigh instead of counting, and the results are reasonably accurate, probably quite as accurate as the usual count. The weight per dozen of each item is first determined. Then the silver is weighed by trayfuls or boxfuls, and the total weight divided by the weight per dozen.

If a butter cutter is not available, print butter can be cut on the bread slicer.

Two weeks after washable walls are painted, and immediately after each washing, they should be covered with a coating of laundry starch. This is put on with a sponge by the regular wall washers. It does not materially change the appearance of the walls, but it protects the paint and cuts in half the labor needed for the next washing. The dirt adheres to the starch, which is easily removed from the wall.

THE AMERICAN DIETETIC ASSOCIATION

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* These are reports of separate problems which have never appeared in the JOURNAL but have been printed for distribution.

WHO'S WHO IN THIS ISSUE

E. Neige Todhunter, B.S. and M.S., University of Otago, New Zealand, and Ph.D., Columbia University, majored in nutrition at the latter university under Dr. Sherman. She is a member of the American Chemical Society, American Association for the Advancement of Science, American Dietetic Association and American Home Economics Association. Since 1934 Dr. Todhunter has been associate professor of nutrition, Agricultural Experiment Station and College of Home Economics, State College of Washington. She has published nearly thirty papers on or related to nutritional research, many of which concerned vitamin investigations.

Sophia S. Halsted, B.S., Michigan State College, and M.S. (public health) University of Michigan, is a member of the American Dietetic Association, American School Health Association, and American Public Health Association. At present Miss Halsted is director, Division of Nutrition, Department of Health, Detroit, and special lecturer in public health nutrition for the University of Michigan.

J. Ernestine Becker was a contributor to this JOURNAL for May and December, 1939, and was noted under this section in those issues.

E. M. Chase, principal chemist in charge, Laboratory of Fruit and Vegetable Chemistry, Bureau of Agricultural Chemistry and Engineering, United States Department of Agriculture, Los Angeles, is a member of the American Chemical Society, Association of Official Agricultural Chemists, American Association for the Advancement of Science, American Institute of Chemists, American Public Health Association, and the American Philatelic Society.

R. E. Clegg, B.S. (Chem. Eng.), Rhode Island State College, and M.S. North Carolina State College, is a member of the North Carolina Academy of Science. He was formerly a teaching fellow at North Carolina State College, and at present is attached to the North Carolina Agriculture Experiment Station. **G. H. Satterfield** was noted under this section for May 1939.

Arthur A. Knoll, business manager, Long Beach (California) City Schools, is a graduate of Harvard University. He is chairman of the Cafeteria Costs Committee of the National Association of Public Schools Business Officials, and a past president of the Public School Business Officials Association of the State of California. Mr. Knoll is a member of the Civil and Structural Engineers Association of Long Beach and author of several published articles on the financial and personnel (non-teaching) management of schools.

Lucy Wilson Parsons received the B.S. degree in home economics, University of Missouri, and the M.S. degree, University of Michigan. She is a graduate of the student dietitian training course at the University of Michigan Hospital and studied under a Gerber Fellowship at the University of Michigan Hospital in 1933–35. Mrs. Parsons was formerly dietitian at the Missouri State Hospital No. 2, St. Joseph, and the South Department Convalescent Unit of the University of Michigan Hospital and the University Health Service. Since 1936 she has been on the staff of the School Lunchroom Department, Board of Education, Detroit.

Mary M. Harrington, B.S., M.A., is director of dietetics, Harper Hospital, Detroit. She is a member of the Detroit Physiological Society, and dietitian on the Advisory Council of the Detroit Diabetic Association. Miss Harrington is a prominent member of her national, state, and local associations and has served in several official capacities in these. Her abilities as an administrative dietitian as well as in the field of diet therapy are unquestioned.

Anna dePlanter Bowes, a frequent contributor to this JOURNAL, has been director of nutrition education, Philadelphia Child Health Society, for a number of years and is president of the Philadelphia Dietetic Association.

Dorothy DeHart is chief dietitian at the Roosevelt Hospital, New York, and food editor for *Modern Hospital*. Miss DeHart has been active in her city, state, and national dietetic associations, and is a past president of the Greater New York Dietetic Association.